

Release 2.0
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REGIONAL TRANSIT WAYFINDING GUIDELINES & STANDARDS

Guidelines

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METROPOLITAN
TRANSPORTATION
COMMISSION

GUIDELINES

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Regional Transit Wayfinding Guidelines and Standards

Version 2.0

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1. General

1.0 General

Development of this document was sponsored by the Metropolitan Transportation Commission (MTC). This document provides standards for connectivity signage at MTC-designated regional transit hubs within the nine San Francisco Bay area counties. Other transit stations are also encouraged to use these standards for signage improvements.

In particular, these criteria cover specific connectivity requirements for:

- Wayfinding Signage
- Transit Information Displays
- Real-Time Displays

Basic Purposes:

- To efficiently and safely guide and direct the public from one transit system to another transit/transportation system, including schedule information and information regarding transfers between different transit systems.
- To develop a common “look” and “feel” and apply consistent connectivity signage conventions among regional transit operators.
- To improve movement within hubs and give information regarding surrounding area.
- Wayfinding signs installed at MTC-designated regional transit hubs are covered specifically by these technical standards and are subject to MTC approval.

1.1 Application

These criteria apply to MTC-designated regional transit hubs. Twenty-one regional transit hubs have been identified and will be subject to these criteria. In addition, three airports will also incorporate elements of these criteria. The selected hubs include those that provide connections between several different service operators, those that have very high levels of transferring between the services of different operators, and those that have a prominent geographic or strategic location in a particular county or sub-region. It is anticipated that there will be new hubs coming online in the future as part of MTC’s Regional Transit Expansion Program (Resolution No. 3434) that includes several new rail bus and ferry expansion projects. Some of these new expansion projects’ hubs will become part of the regional hub system and therefore will be subject to these criteria. Other capital projects that support transit connectivity and are funded with regional discretionary funds may be subject to these standards in the future.

Portions of these criteria shall serve as tools for wayfinding system planning at transit stations and stops within the MTC jurisdiction which are not currently designated transit hubs, particularly stations and stops providing connecting service between more than one transit operator whenever funding is available for wayfinding improvements.

Wayfinding conventions described in these criteria may also be used to extend wayfinding into the communities beyond the area prescribed for transit hub connectivity signage and information.

1. General

1.2 References and Resources

Final Summary Report, MTC Transit Connectivity Plan, May 1, 2006, and Appendices, particularly Appendix A-4, Connectivity Guidelines, Wayfinding, and Appendix C, Memorandum 4, Proposed Wayfinding Signage Program.
Refer to: <http://mtc.ca.gov/planning/connectivity/>.

California Building Code

U.S. Department of Justice, ADA Accessibility Guidelines for Buildings and Facilities.
Refer to: <http://www.ada.gov/stdspdf.htm>

The American Institute of Graphic Arts, AIGA

U.S. Department of Transportation, Reproduction Art and Guidelines

Transportation Research Board, Transit Cooperative Research Program (TCRP): Report 12, Guidelines for Transit Facility Signing and Graphics.
Refer to: <http://www.tcrponline.org/bin/publications.pl>

California Manual on Uniform Traffic Control Devices (MUTCD).
Refer to: http://www.dot.ca.gov/hq/traffops/signtech/mutcdsupp/ca_mutcd.htm

U.S. Department of Transportation, FHWA, Standard Highway Signs.
Refer to: http://mutcd.fhwa.dot.gov/ser-shs_millennium.htm/

In addition to the specific signage design requirements specified and illustrated herein, refer to TCRP Report 12, Chapter 6, for general signage design guidelines.
Refer to: http://onlinepubs.trb.org/onlinepubs/tcrp/tcrp_rpt_12-a.pdf

1.3 Acronyms and Abbreviations

ADA	Americans with Disabilities Act
FHWA	Federal Highway Administration
MUTCD	Manual on Uniform Traffic Control Devices
MTC	Metropolitan Transportation Commission
TCRP	Transit Cooperative Research Program
TID	Transit Information Display
Clipper®	San Francisco Bay Area's "Smart Card" for transit fare payment

1. General

1.4 Basics of Connectivity

The transit rider or the customer generally has one purpose in mind — getting from here to there on transit with the greatest ease and convenience possible. The customer’s ease of transferring from one transit system to another is “connectivity.”

Connectivity is an indicator of a customer’s ability to use more than one transit system for a single trip. Effective connectivity improves a transit trip that requires multiple operators to travel to work, school, a government service center, a shopping district, or other destinations. By making a multi-operator trip nearly as easy as a single operator trip, good connectivity can attract new transit riders, retain existing riders and increase people’s mobility. Good connectivity results in a convenient and ‘seamless’ transit system by reducing travel times, providing more reliable connections, making it easier to pay, and ensuring that transfers are easy and safe.

1.5 General Transit Hub Wayfinding Design Principles

- A.** Each transit hub itself should be identified with signage so that various user groups (pedestrians, bicyclists, private automobile users, and transit riders) recognize its location. Prominent use of operator logos is important to let the public know which transit services are available at the hub. Transit hub locations shall be identified with the hub name, where applicable, and hub operator logos. Refer to “Directional Signage – Transit Entrance Identification” for examples.
- B.** Within the transit hub, provide wayfinding signage consisting of directional signage and maps to connecting bus stops, shuttle stops, taxi stands, bicycle routes, and pedestrian routes, as well as nearby streets, attractions, and landmarks.
- C.** Directional signs should:
 - Direct customers within a transit hub to transit stops and stations, taxi stands, ferry terminals, exits, and other facilities and amenities.
 - Direct customers to transit information displays and real time information systems.
 - Direct customers into and away from the transit hub via bike and pedestrian paths and adjoining streets.
 - Direct customers to nearby streets, points of interest or used for north/south/east/west orientation purposes (most often used on kiosks).
- D.** Provide clear identification of local transit connections. Operator logo, and particular colors (adopted to signify transit connections or to identify a particular transit system) shall be used to identify various transit services. Specific platforms and stops should be identified with route designations (numbers and letters) and destinations.

1. General

- E.** Transit connectivity information at hubs shall include both local and regional scale maps showing transit routes and popular destinations near transit services. These maps should emphasize connectivity between transit systems.
- These local and regional maps help orient customers and help them find their connecting transit or their destinations in the surrounding community. These maps and other information should be sufficient to help customers determine what transit system/route will get to their destination, where they can find the transit stop, and the particular schedule for the connecting service.
 - Schedule information shall, at minimum, include frequency of service during different periods of the day and week. In addition, there shall be an explanation of payment (such as fares, “exact change” requirement, and acceptability of transfers and Clipper®).
 - Information shall be presented in a consistent manner among transit system to aid customers’ understanding.
- F.** Real-time transit information allows customers to know when to expect their next bus or train. This tool is an important component of regional transit connectivity. Providing real-time and accurate transit information can not only enhance transit usage, but can also provide a more accurate means for the public to review transportation alternatives in the area, which could result in mode shifts to public transportation.
- Regional real-time displays (e.g. displays funded by the region to provide real-time information for multiple transit agencies connecting through a transit hub) should be placed at locations in the hub accessible to all transit customers since the signs display transit departure information for multiple transit agencies. Regional real-time displays should be outside any paid station areas to enable decision-making prior to entering the transit system. The number of regional real-time display locations will vary depending on the size of the hub and the number of customer access points. Placement of regional real-time displays shall be adjacent to each TIDs location wherever possible.
 - Non-regional real-time displays can be placed at several locations within the transit hub: 1) directly outside the paid station area to enable decision-making prior to entering; 2) within the station to direct passengers to the correct platform or stop (especially important if loading locations change frequently) and 3) at the stop itself to provide real-time information as passengers wait and to assist in ensuring that they board the correct vehicle. The displays should be easy to read and provide continuous updates.
- G.** MTC shall be responsible for keeping all information concerning the transit system stops, routes, fares, and schedules up-to-date (consisting of TIDs and wayfinding kiosk inserts installed at the twenty-four (24) Transit Hubs identified in the Transit Connectivity Plan). Signage and information systems shall be designed to facilitate updating of information. In addition, there shall be a procedure in place to maintain the wayfinding elements, including the real-time displays. These roles and responsibilities are fully defined in MTC Resolution 3866 (Transit Coordination Implementation Plan).

1. General

1.6 Design Principles - Wayfinding

Wayfinding is defined as the process which allows people to determine their location, determine their destination, and develop and follow a plan that will help take them from their location to their destination. The following are recommended design principles for transit hub wayfinding including principles regarding spacing and sequencing of signage.

- A. Develop wayfinding as an integral part of the architecture and site design.
- B. Trip Segments and Decision Points: Spatial planning should include analysis of the series of trip segments that an individual must take within a transit hub and to nearby destinations. Understanding these segments (which compose the circulation system of the hub) serves as a framework for identifying decision points and, ultimately, for locating wayfinding signage at the transit hub. Decision points are locations where an individual addresses the intermediate wayfinding decisions like locating entrances and exits, specific transit stops or platforms, and major destinations within and neighboring the hub.
 - Directional signage should not be only installed at “decision points” or intersections. Information must be perceived at or shortly before a decision point otherwise it might not be noticed. Take into consideration lighting levels and density of people using facility in establishing acceptable locations for signage in relation with decision points.
 - Provide wayfinding signage in an appropriate sequence and appropriate level of detail and specificity, for example, “early” signage directing customers to connecting bus stops may state “Transit Connections”, and signage closer to stops would then orient customers to which side of the street is connected with which routes and destinations.
 - Design wayfinding recognizing that decision points vary among customers, i.e. some customers need to find wheel-chair access ramps and others want to find bicycle lanes.
 - In locations that have long segments between decision points additional wayfinding signage may be necessary to reassure transit users that they are on the correct route.
- C. Provide continuous wayfinding leading from the local community to transit and back to local destinations.
- D. Wayfinding addresses needs of a number of groups, including the first time and infrequent transit users, non-English speakers, foreign visitors, the elderly, and the physically and mentally impaired. These potential customers travel to and from the transit hub by various modes of transportation.

1. General

- E.** Future transit hubs should be designed to accommodate wayfinding to support all transit users.
- Design the wayfinding with the use of universal design principles.
 - Design the site and transit hub with the clarity of wayfinding in mind. Example of a design may include the following: make hubs recognizable within the urban fabric (recognizable image); make entries prominent and easily accessed; make transit hubs visible from nearby adjacent streets and other populated areas; arrange paths within hub so that next destinations within hub are visible whenever possible, and arrange stops within the hub so that direction of transit service is apparent.
 - When possible keep transit hub compact to minimize walking distances between transit stops and platforms, to aid clarity of wayfinding, and to increase convenience and security.

1.7 Design Principles - Signage

- A.** Ensure consistency throughout the MTC-designated transit hubs so that there is a recognizable regional look and feel, including the following characteristics for regional sign types:
- Size, shape, and color.
 - Content and format
 - Method and location of mounting
 - Construction and materials
- B.** Signs shall convey a clear, simple, and appropriate message.
- C.** Signage in the public right of way shall be in accordance with applicable codes and standards including those of the local jurisdiction.
- D.** Maximize usage of graphic symbol signs and reinforce graphic symbols with concise text, as appropriate.
- E.** Ensure visibility and legibility.
- Locate signage and information displays for readability and prominence. Height shall be proportionate to viewing distance. Refer to TCRP Report 12.
 - As applicable, organize signage and information displays together in specific zones.
 - Utilize font and symbol size specified in this standard. Verify that size is appropriate for viewing distance. Refer to TCRP Report 12.

1. General

- Provide well-illuminated signs and graphics; use appropriate contrasting background; and minimize glare to ensure visibility and legibility. For definition of contrasting background, refer to TCRP Report 12.
 - Position signs for legibility, but locate signs where sign and customers reading sign will not obstruct traffic.
- F.** Signage should be located where most effective in regard to decision points and other information needs. Existing signage shall be reviewed and, when necessary, modified or removed so that it acts in concert, not conflict, with transit connectivity wayfinding.
- G.** Avoid over-signing in any area. Over-signing is when an area has too many signs as seen from a particular vantage point so that the transit user may become distracted and confused. Signs which can contribute to over-signing include concessionaire signage, advertisements, and even wayfinding, operator identification, and regulatory signs.
- Prioritize signage as seen from each vantage point (particularly decision points) so that wayfinding signage is prominent and not lost among other messages.
 - To avoid the appearance of over-signing, consider organizing concessionaire and advertising signage into particular areas and uniform formats.
 - To eliminate repetitive information, existing wayfinding signs should be removed and replaced with the hub signage standard.

2. Sign Format and Design

2.0 International Pictograms

A pictogram is a symbolic presentation of information through pictures. Pictograms are relatively similar to the objects to which they refer and attempt to bridge language barriers. Pictograms have the advantage of being concise and rapidly perceived. Depending on their familiarity, pictograms may require text augmenting their message. Use of pictograms, as required under these criteria, conforms to national and international conventions as adapted for local needs.

2.1 Operator Logos, MTC-Adopted Pictograms and Arrows

See Signing Conventions herein for illustrations of operator logos, MTC-adopted pictograms, and arrows. Additional pictograms may be used subject to MTC approval.

- A. Integrate pictograms and other signage elements into signage in a consistent manner.
- B. Utilize arrows in accordance with arrow convention.
- C. Install signs with arrows to help ensure unambiguous direction.
- D. Utilize logos of various transit operators to facilitate wayfinding between systems and to help identify station area as a transit hub.
- E. Utilize text with pictograms and icons, as necessary, to better convey message.

2. Sign Format and Design

2.2 Order of MTC-Adopted Pictograms and Icons

Typically, modal pictograms are the primary information on a directional sign and should lead. The following lists indicate the order in which pictograms and icons shall be arranged. Note: the order of pictograms and icons may be adjusted to suit field conditions. For example, pictograms indicating exits, stairs, and elevators may take precedence on some signs.

- A.** Information - Transit “i”
- B.** Transit Operators (modal)
 - Rail (urban/heavy-commuter/light/streetcar/cable car)
 - Ferry
 - Bus (BRT/by order of Level of Service (LOS) provided)
- C.** Other Transportation Providers (Non-Transit)
 - Shuttles
 - Major Private Services
 - Airporters/Greyhound (by order of LOS provided)
 - Taxis
- D.** Bike Parking
 - Station
 - Rack
 - Lockers (order reversed with rack, if lockers are available to those without prior reservations)

3. Sign Conventions

3.0 General

- A. Following conventions are mandatory for use in MTC-approved transit hub wayfinding, as applicable.
- B. Table shows official operator color standards. Transit mode icons used on map TIDs are differentiated using these colors. Where more than one color is shown for a particular agency, use the first color listed.

3.1 MTC-Adopted Pictograms

Connectivity Logos



511.org
 Green: Pantone 363C
 Black: Pantone Process Black C



511.org with tag line
 Green: Pantone 363C
 Black: Pantone Process Black C



All Nighter
 Blue: Pantone 296C
 Red: Pantone 603C



Clipper®
 Blue: Pantone 7264C



MTC
 Blue: Pantone 540C
 Red: Pantone 485C



Transit Connectivity Banner Icon and for Kiosk
 Orange: Pantone 151 C
 Black: Pantone Process Black C

3. Sign Conventions

Operator Logos



ACE Train

Purple: Pantone 260C
Blue: Pantone 294C



AC Transit

Green: Pantone 342C
Black: Pantone Process Black C
Gradient: Pantone Process Black C



Alameda Harbor Bay

Turquoise: Pantone 287C
Blue: Pantone 3145C
Purple: Pantone 228C



Alameda/Oakland Ferry

Burgundy: Pantone 228C
Blue: Pantone 287C
Teal: Pantone 3145C



Amtrak

Blue: Pantone 302C



BART

Blue: Pantone Process Blue C
Black: Pantone Process Black C



Baylink

Blue: CMYK 100-58-0-21
Green: CMYK 69-0-100-0



Blue & Gold Fleet

Blue: Pantone 287C
Yellow: Pantone 109C

3. Sign Conventions

Operator Logos



Caltrain
 Red: Pantone 186C
 Black: Pantone Process Black C



Capitol Corridor
 Dark Blue: CMYK 100-80-0-45
 Light Blue: CMYK 50-25-0-5
 Yellow: CMYK 0-28-100-0



Delta Breeze
 Coral: CMYK 0-47-29-0
 Dark Blue: CMYK 63-12-2-60
 Turquoise: CMYK 87-0-38-0
 Light Blue: CMYK 42-8-0-40



Dumbarton Express
 Blue: CMYK 100-43-0-0
 Black: CMYK 100-100-100-100



Fairfield and Suisun Transit
 Blue: CMYK 100-75-0-0
 Green: CMYK 75-0-100-25



Golden Gate Transit
 Orange: Pantone 173C
 Blue: Pantone 294C
 Green: Pantone 369C



Monterey-Salinas Transit
 Blue: CMYK 100-90-8-1
 Black: CMYK 100-100-100-100



Muni
 Red: Pantone 200C

3. Sign Conventions

Operator Logos



Santa Cruz Metro

Dark Blue: CMYK 100-79-0-0

Light Blue: CMYK 38-0-16-0

Yellow: CMYK 0-0-93-0



SamTrans

Blue: Pantone 287C

Red: Pantone 186C



Stanford Shuttle

Red: Pantone 201C

Green: Pantone 3298C



SolTrans

Yellow: Pantone 7549C

Green: Pantone 363C



VTA

Blue: Pantone 302C

Burgundy: Pantone 201C

3. Sign Conventions

Mirror images of the icons below are allowable to help with wayfinding needs.

Principal Connectivity
Modal Icons
or Pictograms



BART Train



Bus



Intercity and
Commuter Rail



Ground
Transportation



Light Rail



Streetcar



Taxi



Trolley



Water
Transportation

Other Modal Icons /
Pictograms



Air
Transportation



Automobile



Bicycle Lockers



Bicycle Parking



Bicycle Station



No Parking



No Pedestrian



OAK Airport

3. Sign Conventions

Other Modal Icons / Pictograms (Cont'd)



Parking
PMS 300 CV



Park-n-Ride



Pedestrian



SFO Airport

Access Pictograms



Elevator



Escalator



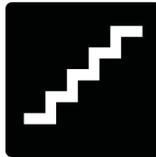
Exit (Always accompanied by the word "EXIT")



ISA (For Directional Signage)
PMS 300 CV



ISA (For Transit Information Display Map)
PMS 300 CV



Stairs

Amenities and Communications Pictograms



Baggage



Ballpark



Bart Ticket



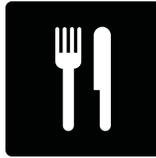
Clipper®

3. Sign Conventions

Amenities and Communications Pictograms (Cont'd)



Coffee



Food



Men's Restroom



Restrooms



Shop



Station Agent



Telephone



Text Telephone (TTY)



Ticket Store (Purchase)



Ticket Vending



Volume Control Telephone



Waiting Room



Women's Restroom



You Are Here (TID Maps)

Highway Symbols



CA State Highway



Interstate Shield



Interstate Shield



US Route Number

3. Sign Conventions

3.2 Directional Arrows

Directional arrows are a critical element in any wayfinding convention. The following section provides the guidance for general deployment of arrows and how to use under specific circumstances:

Do not use two of the following arrows, each with a different message, on a single sign. Physically separate such messages to avoid ambiguity.

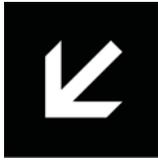
If the vertical clearance is sufficient, the first message may be installed above the second message. If there is insufficient vertical clearance, the two messages may need to be installed side-by-side.

Direction	Pictogram	Usage
Up		Use at foot of stairs or escalator to indicate destination on upper level; proceed upward. May also be used to indicate destination ahead; proceed in a forward direction.
Left		Destination to the left; turn left at this point; or turn left immediately.
Down		Use at head of stairs or escalator to indicate destination on the lower level of a multi-level hub; proceed downward.
Right		Destination to the right; turn right at this point; or turn right immediately.

3. Sign Conventions

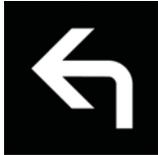
The following arrows; Arrow Down Left, Arrow Down Right, Arrow Up Left, or Arrow Up Right, shall be used only when the available sign location or locations use of Arrow Up, Arrow Left, Arrow Down or Arrow Right are impractical. These arrows only apply to escalators, stairways, or in areas where there are more than one level or grade. The arrows can be used to represent diagonal movement where there is no grade change.

The following arrows should not be used when an escalator or stairway is of a sufficient distance from the sign that a horizontal arrow (see above) would be appropriate, followed by a down arrow at the escalator or stairway.

Direction	Pictogram	Usage
Down Left		Escalator or stairway leading downward which is to the left of the reader.
Down Right		Escalator or stairway leading downward which is to the right of the reader.
Up Left		Escalator or stairway leading upward which is to the left of the reader.
Up Right		Escalator or stairway leading upward which is to the right of the reader.

3. Sign Conventions

The following arrows shall be used only when necessary due to indirect path of travel, physical obstructions and limitations to sign placement. These arrows should be used when the previously described arrows will not direct customers to the correct location.

Direction	Pictogram	Usage
Forward Left 90 °		Escalator or stairway leading downward which is to the left of the reader.
Forward Right 90 °		Escalator or stairway leading downward which is to the right of the reader.
Left 90 ° Forward		Escalator or stairway leading upward which is to the left of the reader.
Right 90 ° Forward		Escalator or stairway leading upward which is to the right of the reader.

3.2.1 Arrow Ordering Conventions: Multi-Directional

Where multiple destinations and directions are shown in a horizontal arrangement, the messages should be organized in order of arrow directions, from left to right, as follows:

- Left Arrow
- Arrow, Up Left
- Up Arrow
- Arrow, Up Right
- Right Arrow

Combining the Down Arrow with any other direction should be avoided; the principle being that vertical access directions should not be combined with same-level directions on the same sign unit. The U-turn Arrow should be avoided if at all possible. It should not be combined with other directions in a multi-message sign.

3. Sign Conventions

3.3 Message Conventions

3.3.1 Nomenclature

The specific words used to identify features, functions, and destinations in signage should be consistent across all transit hubs and signs.

Prepositions are omitted at the beginning of a message. Example: “Fremont”, not “To Fremont”.

Where applicable, use the phrase “Transit Connections” and include modal icons, and connecting transit operator logos.

For the Exit directional sign the phrasing shall be patterned after the following example: “Exit A1 Market Street.” The example applies a number letter convention following the word “Exit” and the exit icon, with the name or names of adjacent streets inserted following the number letter convention.

Foreign language headers can be inserted into transit information displays to provide clearer direction at those hubs where there is a need for communicating with a large non-English speaking group of transit users. Usage of foreign language headers requires MTC approval.

3.3.2 Typography

Wayfinding messages shall be set in upper and lower case type or all upper case in accordance with prototype signs and transit information displays included in these criteria. Fonts shall be San Serif. Examples of text that is always upper case are transit operator and airport abbreviations such as “AC Transit”, “BART”, and “SFO”. Note that the word “Exit” shall also be in all capital letters where required by code.

3.3.3 Abbreviations

Use an ampersand “&” instead of “and” when connecting two words which naturally belong together because of similarity of function or geographical proximity. Use of an ampersand is also permitted when space constraints do not allow use of the word “and”. In addition, use an ampersand when it is part of a transit operator name such as “Blue & Gold Fleet”.

Names of destinations shown on signs may also need to be abbreviated due to space constraints (example: “Bay Pt”). Where abbreviation is necessary, it is important that the name be abbreviated the same way each time.

Limit use of abbreviations to the most common and widely understood such as:

Abbrev.	Description	Abbrev.	Description	Abbrev.	Description
N	North	Ave	Avenue	Wy	Way
S	South	Bldv	Boulevard	Pkwy	Parkway
E	East	Cir	Circle	Expy	Expressway
W	West	Ct	Court		
St	Street	Sq	Square		

3. Sign Conventions

3.3.4 Punctuation

Minimize use of punctuation while maintaining clarity of meaning and consistency with good grammatical form.

Use a comma between items in a series and to separate two pieces of information, for example, City Center, City Hall.

Joint station names are shown with a “/”; for example: Embarcadero/S.F. Ferry Terminal.

Multiple line destinations, when combined on a single platform identification sign, are shown without punctuation, merely a small additional space; for example:

Downtown San Jose Diridon Gilroy

3.4 Typeface

Font family is Frutiger. Refer to Appendix B: Fonts for illustrations.

3.5 Colors

Standard signage illustrated in these criteria shall have the colors shown in the Appendix A: Artwork. Other color schemes will only be considered if the sign has formally been rejected through the permit review process by the jurisdictional authority (such as a city, not a transit agency) and is required to use a different color scheme as the condition of approval. In this case, the replacement color scheme is subject to MTC review and approval.

Minimum contrast between text and background colors shall be 70 percent in accordance with TCRP Report 12.

3. Sign Conventions

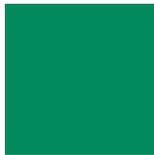
3.6 Colors Used in MTC Signage System

Note: Color samples depicted in this document are for general identification purposes only. Do not use these color swatches for color matching. Use only manufacturer's official color swatches. Consult fabrication specifications for specific sign types for appropriate materials and finishes.

Accessibility / Safety Colors



**Accessibility
Symbol** (Federal
Standard)
595B Blue #
15090



**Safety Green;
Exit Symbol/
Exit Panel
Background**
Pantone 3415C



**Safety Red;
Regulatory /
Safety Symbols**
Pantone 485C

TID Map Colors



Map Banner
Pantone 363C



**Transit
Information Icon**
Pantone 151C



**You Are Here
Icon / Walking
Radius**
Pantone 123C



**Standard Symbol
Background/
Text / User
Symbols**
White



General
PMS Black



**Streets/
Light Gray**
Pantone 400C



**Blocks and
Backgrounds /
Medium Gray**
Pantone 402C



Buildings
Pantone 403C



**Street Names /
Outlines /
Details**
Pantone Warm
Gray 11C

4. Sign Application, Features, Dimensions and Placement

4.0 General

Conform to the standards and templates (artwork) herein and in the Appendices for content, graphics, fonts, and colors.

Where a Transit Information Banner is indicated to be incorporated in a sign type or element, its background color shall be the “banner green”. The Banner will feature the heading “Transit Information” in white. The Banner will feature a white “i” in a round field of “icon orange”. Refer to “Colors Used in MTC Signage System” for illustration and specifications for colors.

See Appendix A: Artwork for examples of artwork for various signs.

4.1 Transit Center Identification

- A. Entrance identification’s primary purpose is to help current and potential transit users identify the entrance to hub, station, bus bay, or ferry dock. The sign shall prominently feature name of hub or station and operating agencies’ logos.
- B. Design of the entrance identification will be tailored to station type and, when applicable, architecture. Specific design will be determined on a hub-by-hub basis by the owner operator in consultation with the hub stakeholders. Examples of transit entrance identification elements are “post or pylon sign” and signs mounted to an architectural element. (See below)
- C. Hub identification must be easily legible from a distance when approaching station/hub.



Fig. 4.1a - Vertical Transit Center Identification, Palo Alto



Fig. 4.1b - Horizontal Transit Center Identification, San Jose Diridon

4. Sign Application, Features, Dimensions and Placement

4.2 Transit Connections (Pedestrian Directionals)

4.2.1 Wayfinding

- A. Signage should be placed between services /at major decision points to support wayfinding and connections. Signage shall direct transit users to platforms, bus stops, taxis, parking, bicycle parking, adjacent streets, and exits.
- B. Specific icons representing each transit mode connecting at the hub shall be used, as well as the icon for static and real-time transit information (orange 'i').
- C. Logos for operators should be used when there is more than one operator providing the same mode, and they are located in different sections of the hub to clearly indicate the path to that operator's service.
- D. Current signage has white text on black background. Operators may not adopt these sign and font colors or implement agency standards.



Fig. 4.2a - Detail Large Horizontal Transit Connection, San Francisco @ 4th & King



Fig. 4.2b - Large Horizontal Transit Connection, San Francisco @ 4th & King

4. Sign Application, Features, Dimensions and Placement

4.2.2 Exit Identification

- A. Signage will be placed at all exits.
- B. Icons representing exit as well as the text “EXIT” will be on signage.
- C. A specific number/letter naming convention with street names shall denote each individual exit with a unique identifier. This will be mirrored on Station and Transit Stop maps to clearly and consistently facilitate wayfinding.
- D. Exit identification signage shall have white text on green background.



Fig. 4.2c - Small Horizontal Transit Connection, Mountain View



Fig. 4.2d - Vertical Transit Connection, Palo Alto



Fig. 4.3a - Information Flag, Fairfield

4.3 Information Flag

The Information Flag is a four sided cube which helps identify where additional transit connection information is located. These signs are either mounted to a wall or attached to a free-standing Transit Information Display. Refer to the artwork in Appendix A.

4. Sign Application, Features, Dimensions and Placement

4.4 Wayfinding Kiosk

The Wayfinding Kiosk is a freestanding sign that will be placed on street or at the periphery of the transit hubs. It features a pole-mounted, double-sided kiosk that contains a map with stop and route information to facilitate connecting between transit operators. Each side of the kiosk has four major features:

- Identification Banner (top)
- Wayfinding Messages (middle)
- Map (middle)
- Key (bottom)

4.4.1 Identification Banner

The Identification Banner is expected to be a permanent part of the kiosk. Refer to Appendix A: Artwork for layout of the Identification Banner.

4.4.2 Wayfinding Messages

Describe types 2-line, 3-line, arrow convention, white line separate topics/destinations, appropriate contents i.e. street names, destinations, paths, neighborhoods when pointing outward, or station names when pointing inward (all with minimal abbreviation)



Fig. 4.4a - Wayfinding Kiosk, San Jose Diridon

4. Sign Application, Features, Dimensions and Placement



Fig. 4.4b - Wayfinding Kiosk,
San Francisco Embarcadero



Fig. 4.4c - Wayfinding Kiosk,
San Francisco Embarcadero

4.4.3 Map

The map with its key and logo will be a single standard sized insert for ease of replication in each setting and ease of replacement within the kiosk housing. Kiosks will be designed to allow this printed insert to be easily swapped out to maintain updated information. The map and key will be consistent with transit information display Transit Stop Map will also include the station/hub name. Important elements are:

- A. The map will be icon- and logo-based, generally oriented to the north, and have a north arrow.
- B. There will be a consistent “You are here” icon and a walking radius (based on 1/8 mile distance increments) on all maps. The scale of the map may require a different size radius. In all cases, the distance should be measured both in feet and time.
- C. Each transit operator will be represented by a unique color, consistent with their logo to the extent possible.
- D. Boarding areas for transit will be clearly marked while showing the particular operator and route serving the location. Station and Stop maps will show the direction of travel.
- E. Station exits will be identified, when appropriate, by a number/letter or street name convention on the map. Exit identification number/letters shall be selected which do not resemble route designations used by any agency at the hub.

4. Sign Application, Features, Dimensions and Placement

- F. The map will convey key local destinations to assist with ‘last mile’ wayfinding at the end of a transit trip.
- G. The sign face directing customers towards the transit center will contain the Transit Station map. The sign face directing customers away from the transit center will contain the Transit Stops or Transit Routes map.

4.4.4 Key Area

- A. The key will list the logos of transit operators, icons for the types of transit service provided, and other important icons (such as “You are here”) and distance/time radius accompanied by simple text to help the user interpret the map. Icons in the key shall be ordered top-down as follows:
 - “You are here” icon
 - “1,000-Foot Radius (five minute walk)” icon (The scale of the map may require a different size radius. In all cases, the distance should be measured both in feet and time.)
 - Modal icons (hub stakeholders to determine modal order)
 - All other icons (hub stakeholders to determine order)
- B. As space permits, route names and destinations may be displayed in the key. Hub stakeholders will determine the order in which transit agency routes are listed; however, local service and ridership levels are priority factors in this determination.
- C. The 511 logo will be at the bottom of the key with information about how to get transit information via 511 and 511.org
- D. A point of contact will be identified at the bottom of the key using the text, “Sponsored by the Metropolitan Transportation Commission. Contact us at SignComments@mtc.ca.gov or (510) 817-5900 with feedback on this sign.”

4.5 Transit Information Display (TID)

General

- A. Hub/station name are represented on each map to help orient transit riders to their surroundings.
- B. Each of the four cases has a title identifying the type of information displayed.
- C. All maps and information use a consistent regional design and icon elements.
- D. The 511 logo, located at the bottom of the key, contains information about how to get transit connections information via 511 and 511.org.

4. Sign Application, Features, Dimensions and Placement



Fig. 4.5a - Transit Information Displays, San Francisco @ 4th & King

- E. A point of contact will be identified at the bottom of the key using the text, “Sponsored by the Metropolitan Transportation Commission. Contact us at SignComments@mtc.ca.gov or (510) 817-5900 with feedback on this sign.”
- F. For details regarding each TID see Appendix A: Artwork.

4.5.1 Transit Station Map

- A. The Station Map case will feature a single map detailing the layout of the transit hub. In addition, an inset map of the general area will be inserted to provide context.
- B. The map and key may be customized on a hub-by-hub basis by the lead transit operator and the other transit stakeholders as long as the regional standard is met and subject to MTC agreement.
- C. The map will have a key on the right hand side containing logos of transit operators and icons to identify features and services within the hub (such as the location of TIDs and real-time transit information signs). Icons will have explanatory text to help clearly convey their message.
- D. Station maps shall be generally oriented north and a consistent “You are here” icon will point in the direction a person is facing.
- E. Boarding areas for transit will be clearly marked as well as the particular operator, mode, route designation, and direction of travel.

4. Sign Application, Features, Dimensions and Placement

- F. Streets, pedestrian routes and bicycle routes immediately adjacent to the station will be identified on the map.
- G. Station exits will be identified by a number/letter convention on map (and reinforced in directional signs). For simple surface-level hubs, exits shall be named with name of adjacent street or other identifier, with no number/letter.

4.5.2 Transit Stops Map

- A. The map will feature the locations of bus, ferry, streetcar, and rail boarding areas in and around the hub for each transit operator serving the hub.
- B. The map and key may be customized on a hub-by-hub basis by the lead transit operator and the other transit stakeholders as long as the regional standard is met and subject to MTC agreement.
- C. The map will have a key on the right hand side containing icons to identify features and services around the hub. Icons will have explanatory text to help clearly convey their message. Route destinations will be included in key. The priority for listing icons and routes should follow guidance in Article 4.1.3.
- D. Maps will be generally oriented to the north and have a north arrow and “You are here” icon
- E. Boarding areas for transit should be clearly marked as well as the particular operator, mode, route, destination, and direction of travel.
- F. Key destinations in the area depicted by the map will be noted.
- G. Station exits will be identified by a number /letter convention on map (and reinforced in directional signs).
- H. In some instances the Transit Station Map and Transit Stops map can be combined, resulting in only three TID panels.



Fig. 4.5b - Transit Information Displays, San Francisco Temporary Transbay Terminal

4. Sign Application, Features, Dimensions and Placement

4.5.3 Transit Routes Map

- A. The Transit Route Map case will feature a single map detailing the routes of each transit operator serving the hub. Certain commuter, express, special event, or all-night routes may not be shown if the map will be too cluttered by the additional information, and therefore more difficult to read/comprehend. A footnote in the key will express this.
- B. The map and key may be customized on a hub-by-hub basis by the lead transit operator and the other transit stakeholders as long as the regional standard is met and subject to MTC agreement. The priority for listing routes should follow guidance in Article 4.1.3.
- C. Maps shall be oriented to the north and have a north arrow.
- D. There will be a consistent “You are here” icon on all maps.
- E. The scale of the Transit Route Map will be determined on a hub-by-hub basis, as the hub is the point of departure for connecting transit that serves an area unique to each hub.
- F. The key will show a single distinct color for each operator’s routes to differentiate one operator from another.



Fig. 4.5c - Transit Information Displays, Mountain View

4. Sign Application, Features, Dimensions and Placement

4.5.4 Schedules & Fares

- A. The Schedule/Fare Information case will feature basic route, schedule and fare information for each transit operator serving the hub as well as special regional transit services like 511 Transit/511 Real-Time Transit Information, Bicycle and Clipper®.
- B. An inset of the Regional Transit Map from the “Getting There On Transit” guide will be inserted to provide context for travel in the region.
- C. Basic information for each of the operators serving the hub shall be generally provided in a tabular format and include:
 - Schedules with times for departure of all vehicles on every route that connects at the transit hub. Exceptions to this will be for agencies which will utilize frequency tables and which will provide its own schedules in cases. The format will be structured for ease of maintenance.
 - Agency Description and website (when requested)
 - Operating hours
 - Basic fare information
- D. MTC will be responsible for identifying information that is regional in nature and crafting the message that will be generally located on the right hand side of the printout such as the following:
 - Directions to use 511 Transit to call a specific transit operator, get real-time transit arrival information, connect via 511.org., and to get information about bicycles on transit;
 - Clipper® information
 - Owl Service general reference
 - Regional Bicycle information reference

4.6 Real-Time Information Display Systems

- A. Multi-agency real-time transit information signs shall follow specifications outlined in Regional Real-Time Signs Physical Requirements and Specification.
Reference: <http://www.mtc.ca.gov/planning/tcip/>.
- B. For each transit hub, the Regional Real-Time System will develop and maintain a web page depicting real-time departure information for multi-agency routes. The web page will be broadcast to transit riders via real-time displays. This will ensure a consistent look and feel to the information across all hubs.
- C. At each transit hub, the location of large format, multi-agency real-time displays will be determined as part of the Concept Plan and Design/PS&E phases of the Hub Signage Program, which is MTC’s effort to improve signage at regional transit hubs.

4. Sign Application, Features, Dimensions and Placement



Fig. 4.6a - Wall Mounted Real-Time, Location



Fig. 4.6b - Real-Time Located above a TID, Location

- D.** Any large format, multi-agency signs installed in the field as of September 24, 2008 will be grand-fathered in to this requirement, and will have to meet the regional standard upon replacement of the sign.
- E.** These displays will be either attached to a wall at the transit hub or placed above a TID structure.

5. Materials and Construction

5.0 Materials and Construction

- A. **Materials:** Typically, non-flammable, permanent, and non-fading. Construct signage of vandal resistant materials.
- B. **Construction:** Build to resist seismic events, wind, moisture, vandalism and for easy repair. Select materials and design assemblies, which require minimal long-term maintenance. Construct so that elements can be easily updated, particularly wayfinding kiosks and transit information display panels. Utilize modular construction to the extent possible to permit graphic panels to be removed and replaced as needed. To the extent possible, make operator logos and arrows modular to facilitate easy updates.
- C. Make sure that signs are clearly illuminated day and night. Where lighting fixtures are provided within sign assemblies use long lasting energy efficient lamps and consider use of solar-powered units. Alternatively, use lighting outside of the sign, i.e. general lighting; consider retro-reflective backgrounds and messages, and, as practical, luminescence (glow in the dark).
- D. Standardize designs, materials, assemblies, and attachment methods within and between hubs.

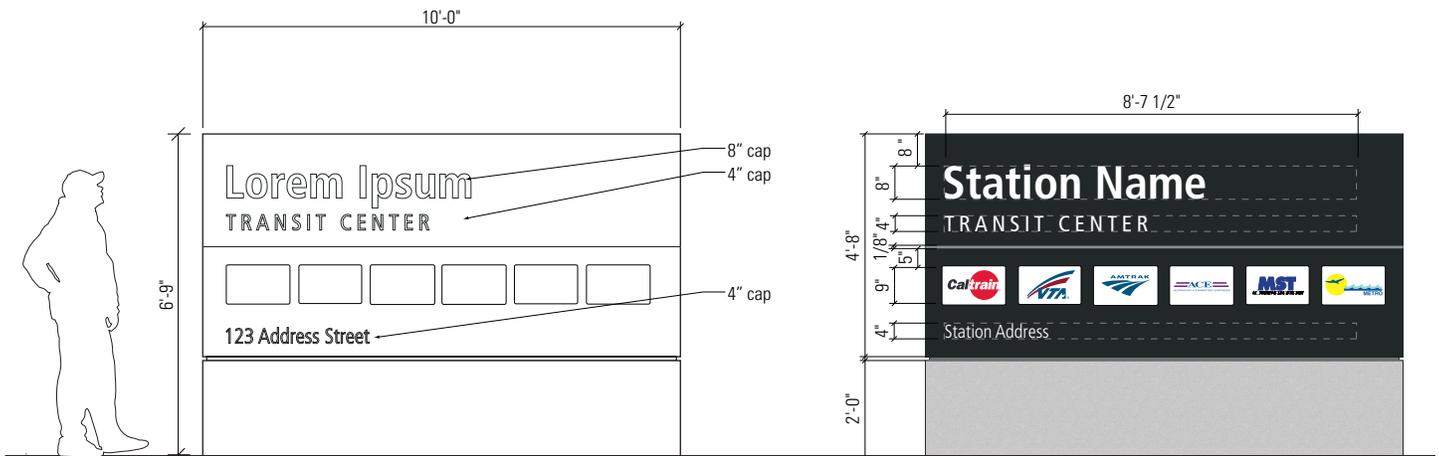
Appendix A:
ARTWORK



Appendix A: Artwork

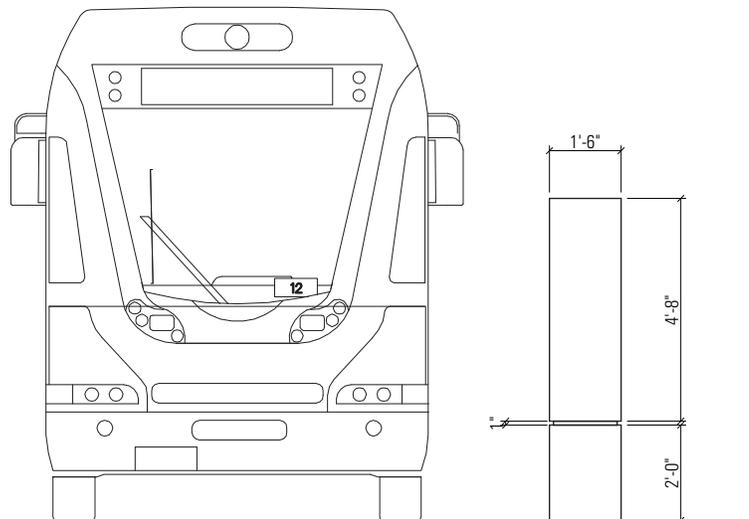
Transit Center Identification-A1 Horizontal

Where appropriate the A1-Horizontal Transit Identification should be located at the entrance. This sign should not be a visual hazard and should be used in hubs with more available property.



1 Type A1 - Front Elevation
Scale: 1/4" = 1'-0"

2 Type A1 - Typical Artwork
Scale: 1/4" = 1'-0"



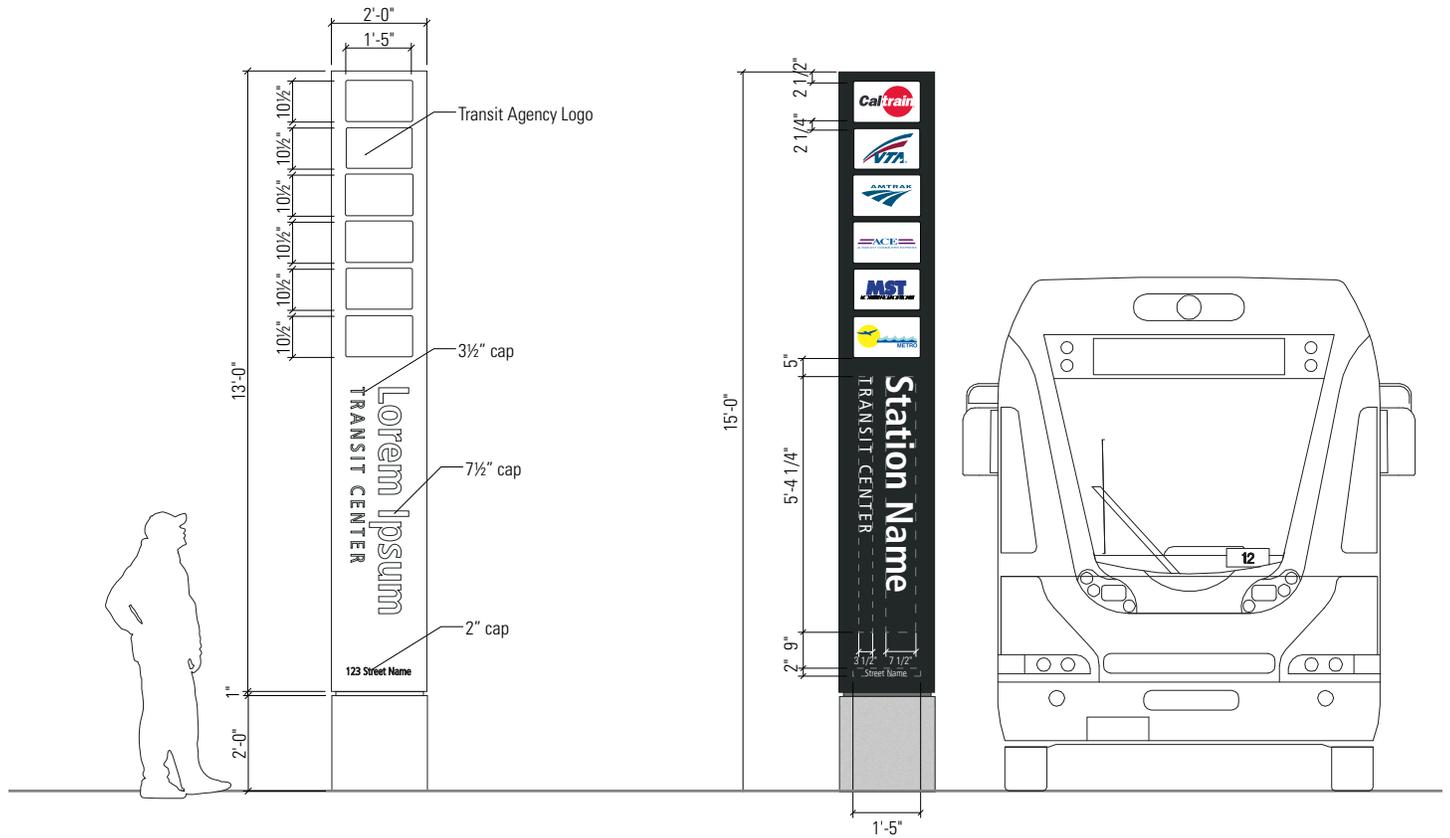
3 Type A1 - Side Elevation
Scale: 1/4" = 1'-0"

4 Type A1 - Plan
Scale: 1/4" = 1'-0"

Appendix A: Artwork

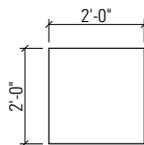
Transit Center Identification-A2 Large Vertical

Description needed



1 Type A2 - Front Elevation
Scale: 1/4" = 1'-0"

2 Type A2 - Typical Artwork
Scale: 1/4" = 1'-0"

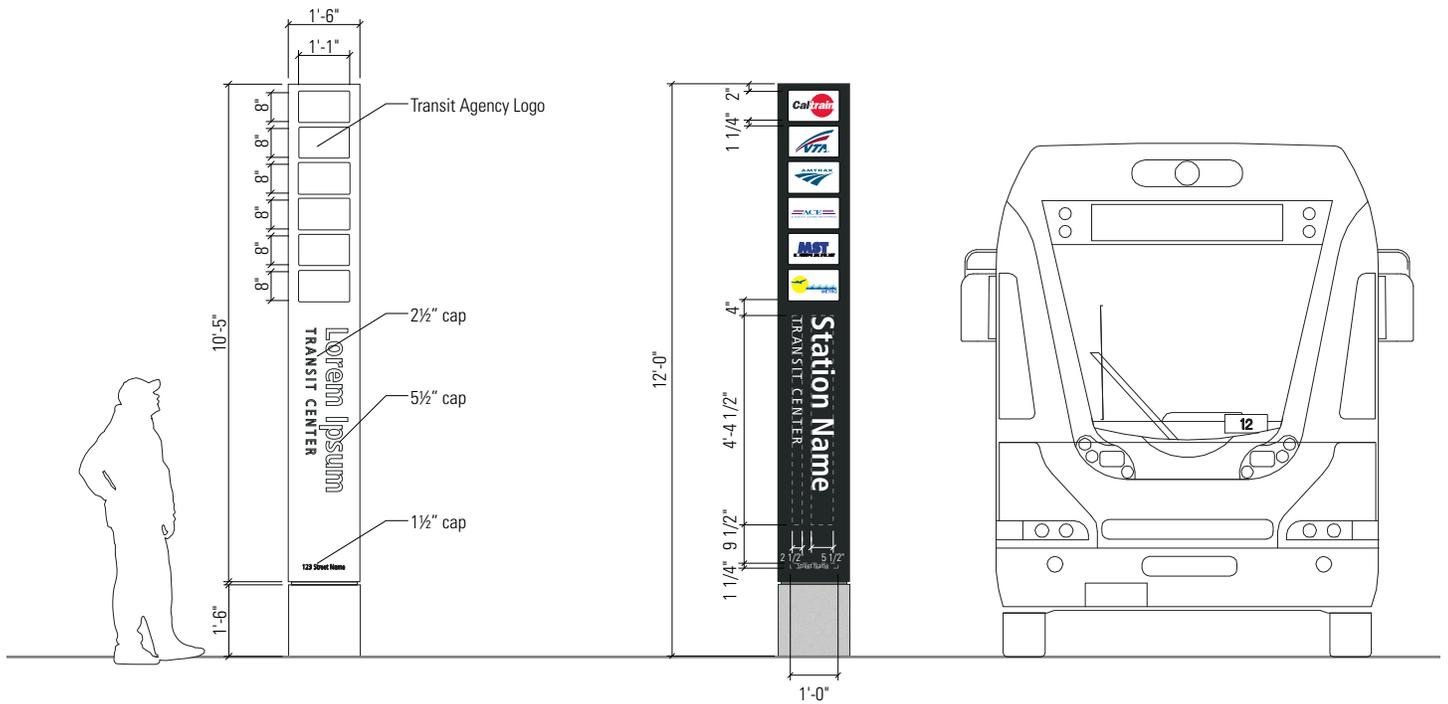


3 Type A2 - Plan
Scale: 1/4" = 1'-0"

Appendix A: Artwork

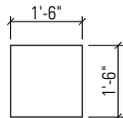
Transit Center Identification-A3 Small Vertical

Description needed



1 Type A3 - Front Elevation
Scale: 1/4" = 1'-0"

2 Type A3 - Typical Artwork
Scale: 1/4" = 1'-0"



3 Type A3 - Plan
Scale: 1/4" = 1'-0"

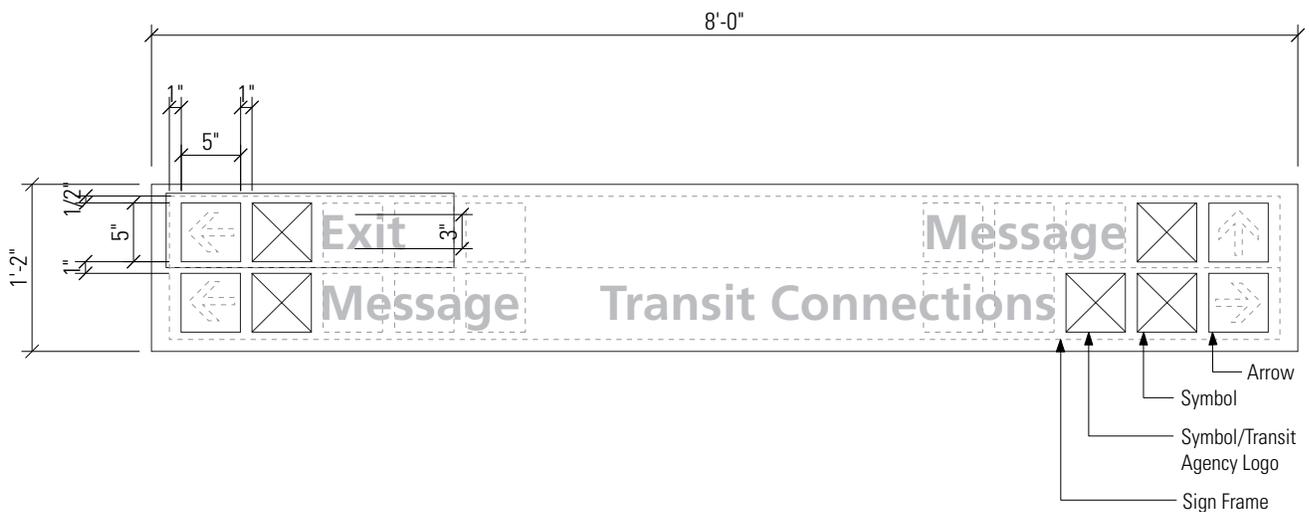
Appendix A: Artwork

Transit Connections (Pedestrian Directional)-Wayfinding C1/C2

Suspended/Wall mounted wayfinding-Description needed



1 Type C1/C2 - Front Elevation
Scale: 1/2" = 1'-0"

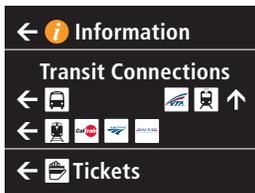


2 Type C1/C2 - Typical Artwork
Scale: 3/4" = 1'-0"

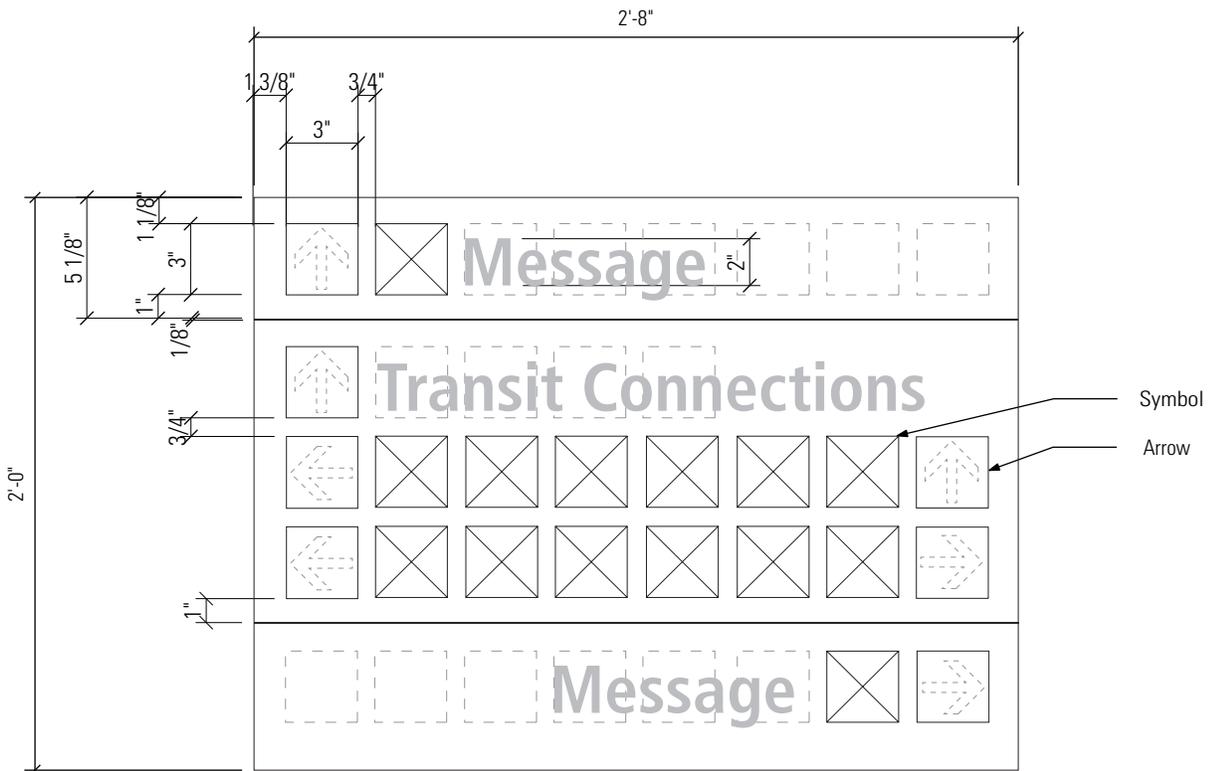
Appendix A: Artwork

Transit Connections (Pedestrian Directionals)-Wayfinding C3

Flag mounted wayfinding-Description needed



1 Type C3 - Front Elevation
Scale: 1/2" = 1'-0"



2 Type C3 - Typical Artwork
Scale: 1 1/2" = 1'-0"

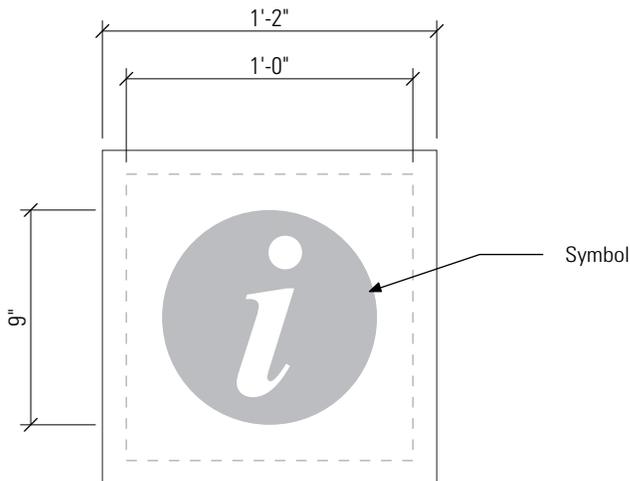
Appendix A: Artwork

Information Flag

Description needed



1 Type I - Front Elevation
Scale: 1/2" = 1'-0"

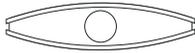


2 Type I - Typical Artwork
Scale: 1 1/2" = 1'-0"

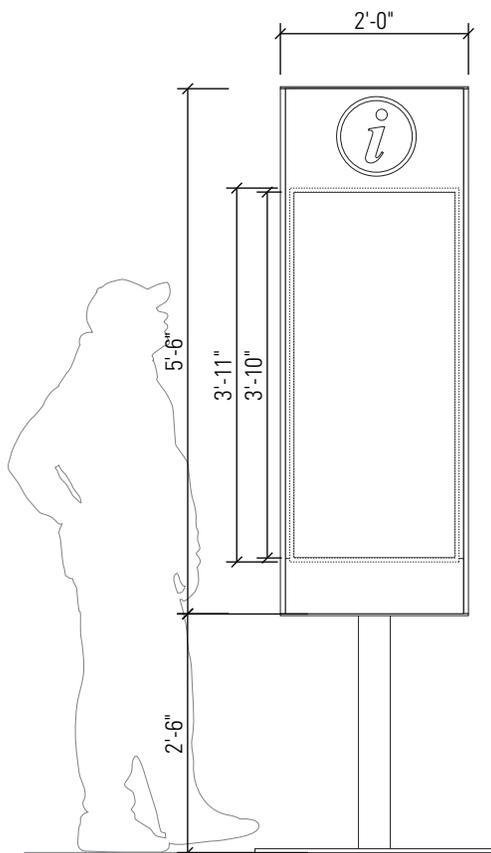
Appendix A: Artwork

Wayfinding Kiosk-General

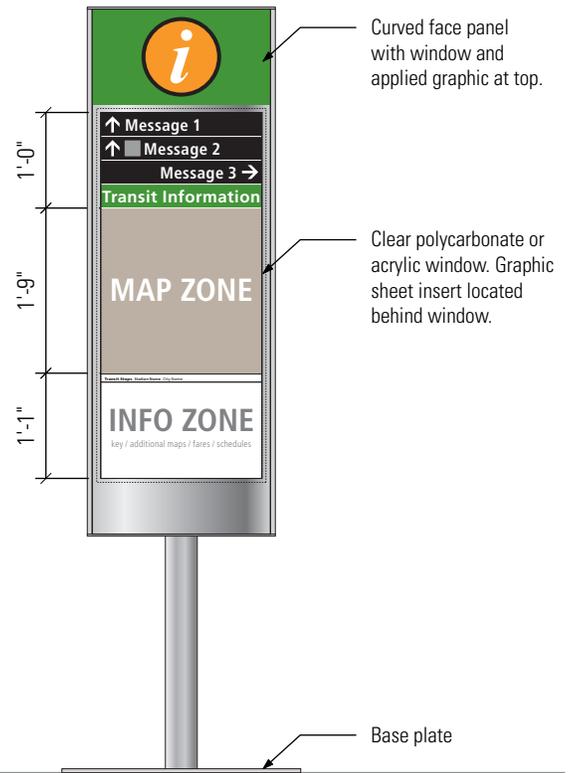
Description needed



1 Type K - Plan View
Scale: 1/2" = 1'-0"



2 Type K - Typical Artwork
Scale: 1/2" = 1'-0"

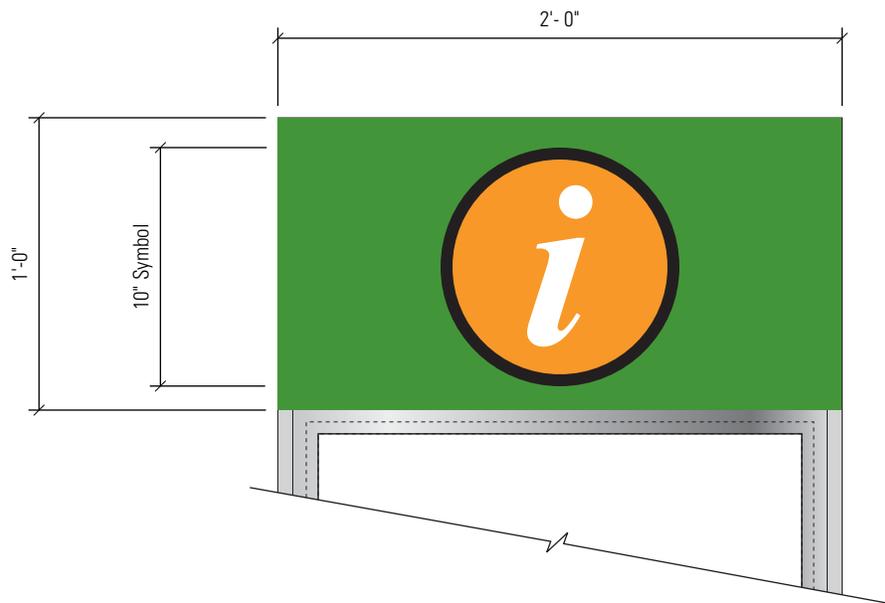


3 Type K - Front Elevation
Scale: 1/2" = 1'-0"

Appendix A: Artwork

Wayfinding Kiosk-Identification Banner

Description needed



1 Type K - Artwork Detail
Scale: 1 1/2" = 1'-0"

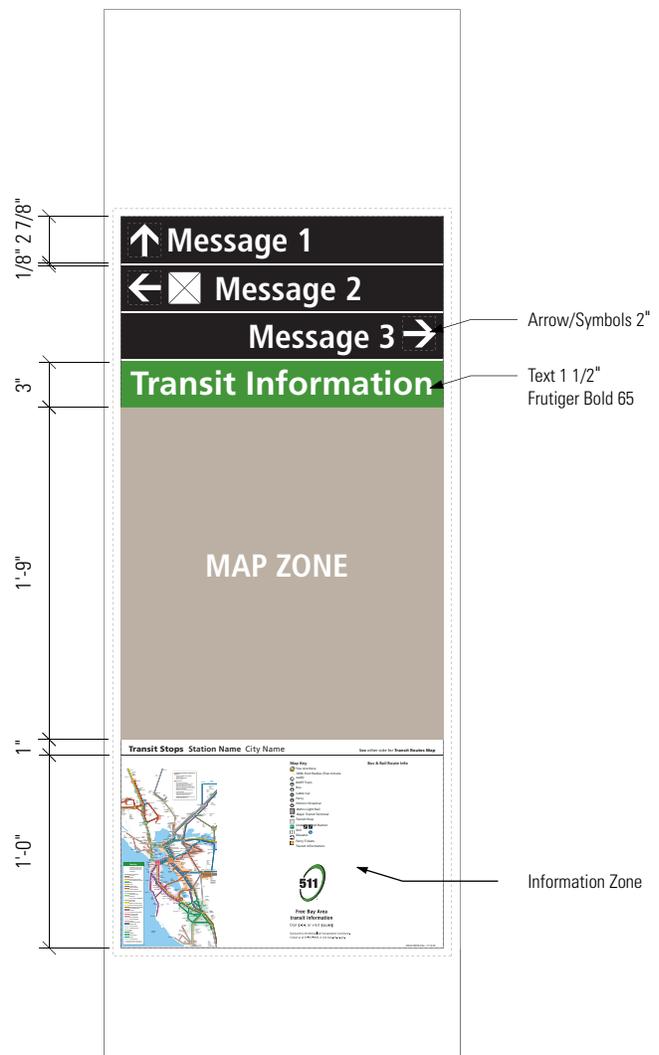
Appendix A: Artwork

Wayfinding Kiosk-Wayfinding Messages, Map and Key

Description needed



1 Type K - Artwork Example
Scale: 1/2" = 1'-0"

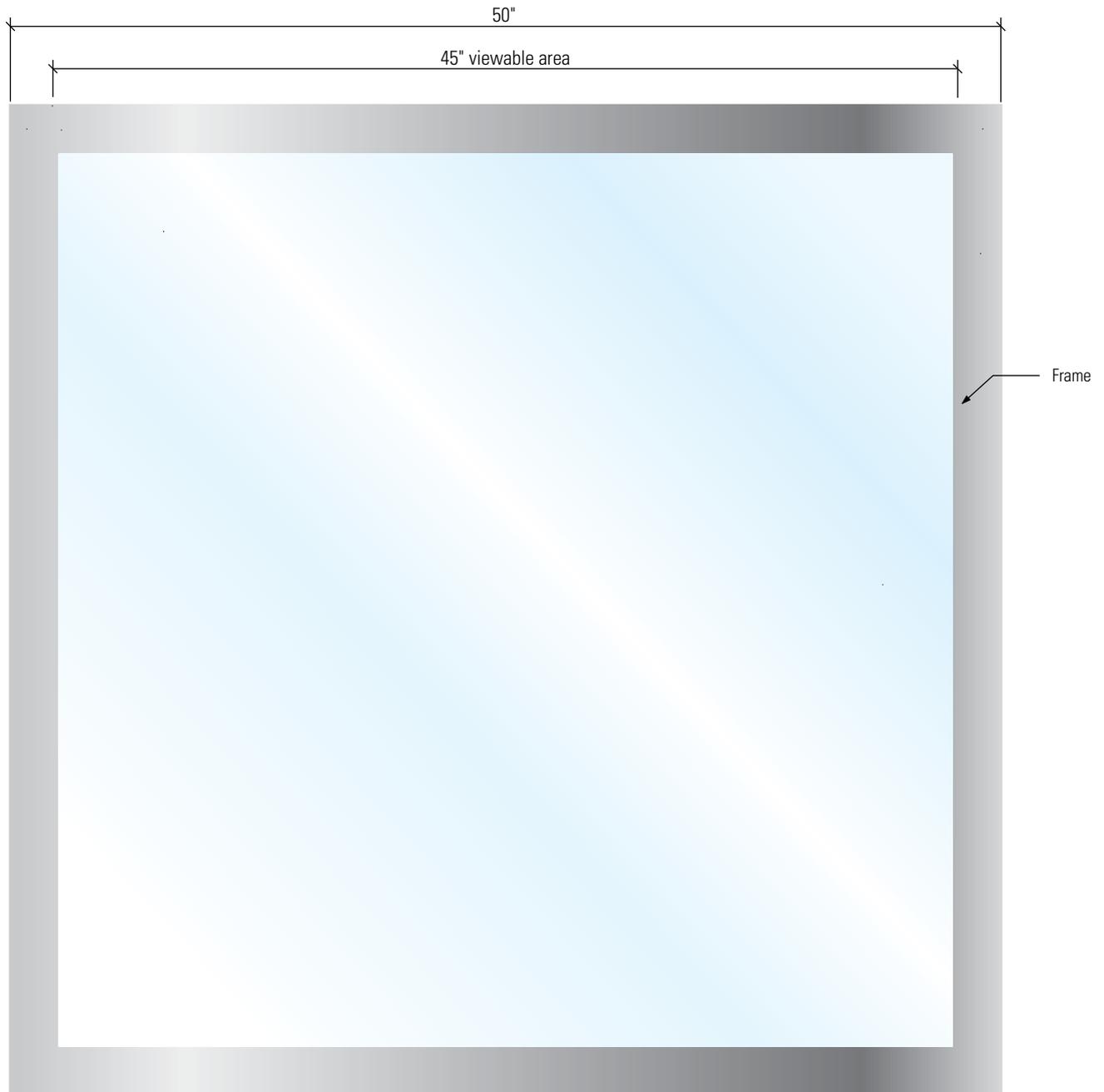


2 Type K - Typical Artwork
Scale: 1" = 1'-0"

Appendix A: Artwork

Transit Information Display (TID)-General

Description needed

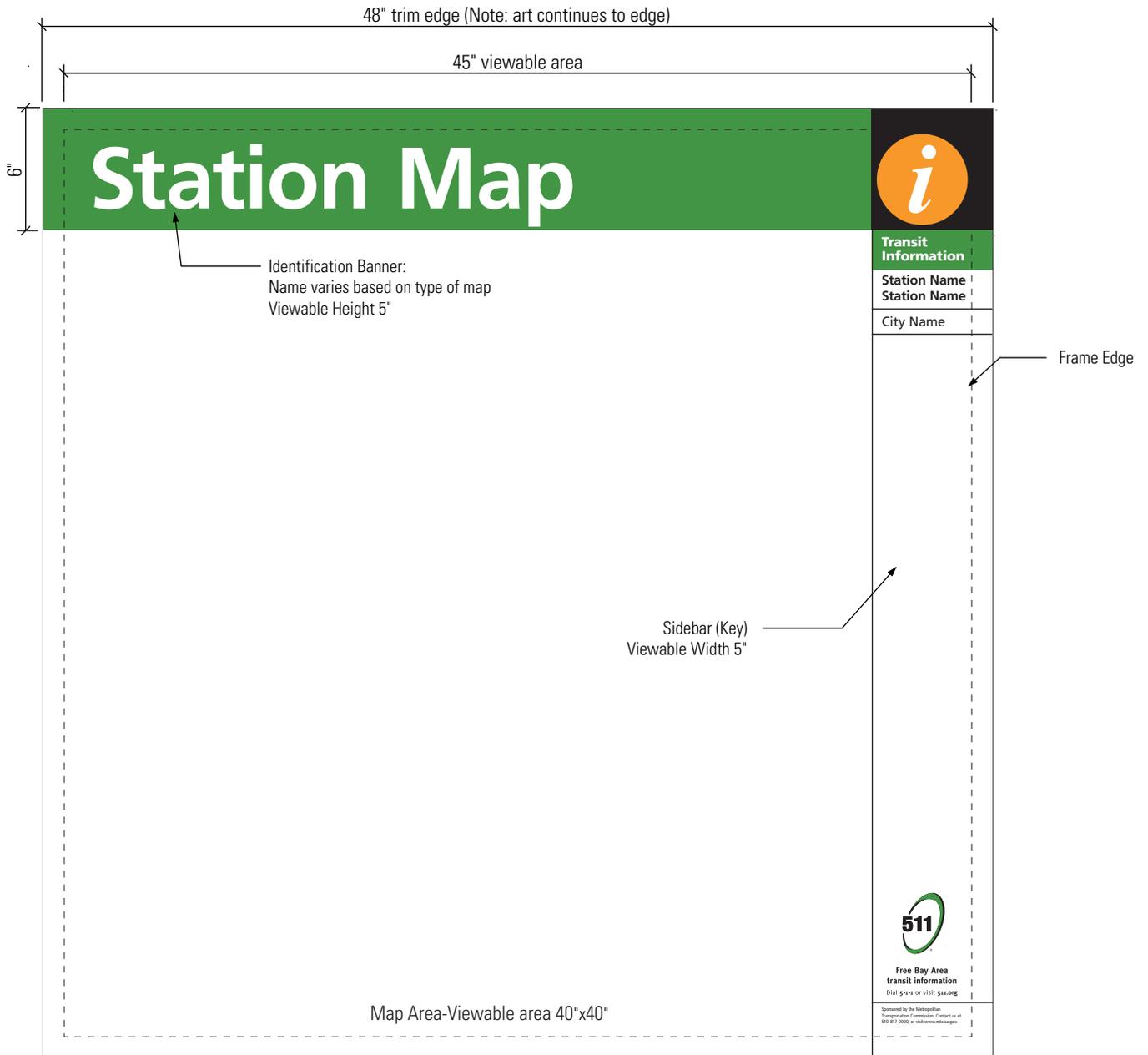


1 Type T - Front Elevation
Scale: 1 1/2" = 1'-0"

Appendix A: Artwork

Transit Information Display (TID)-General Map Insert

Description needed



1 Type T - Typical Artwork
Scale: 1 1/2" = 1'-0"

Appendix A: Artwork

TID-Transit Station Map

Artwork Example for Station Map (Viewable area is within dotted line)



1 Type T-Station Map
NTS

Appendix A: Artwork

TID-Transit Stops Map

Artwork Example for Stop Map (Viewable area is within dotted line)

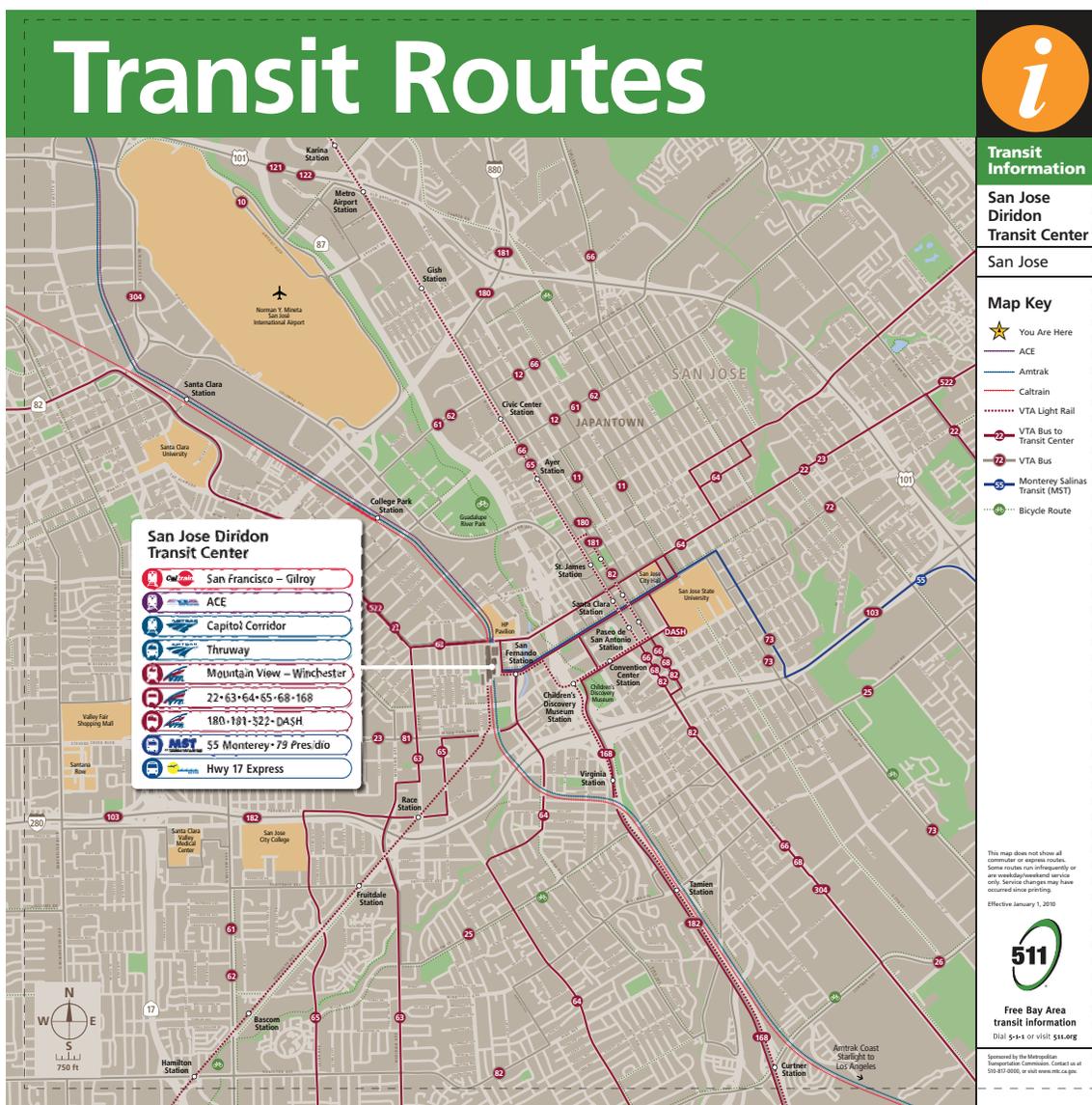


1 Type T-Transit Stops
NTS

Appendix A: Artwork

TID-Transit Routes Map

Artwork Example for Transit Route Map (Viewable area is within dotted line)



1 Type T-Transit Routes
NTS

Appendix A: Artwork

TID-Schedule & Fares

Artwork Example for Transit Schedule/Fare Information (Viewable area is within dotted line)

Schedules & Fares





Valley Transportation Authority
VTA is an independent special district responsible for bus, light rail and passenger operations, transportation management, specific highway improvement projects, and transportation planning throughout Santa Clara County.

Fare Information effective October 1, 2009

VTA FARES	Cash Fares (per passenger)	Prepaid Fares (per passenger)
Adult	\$3	\$4
Senior	\$2	\$3
Child	\$1	\$2
Transfer (30 min)	\$1.75	\$2
Transfer (60 min)	\$2.25	\$2.50
Transfer (90 min)	\$2.75	\$3.00
Transfer (120 min)	\$3.25	\$3.50
Transfer (150 min)	\$3.75	\$4.00
Transfer (180 min)	\$4.25	\$4.50
Transfer (210 min)	\$4.75	\$5.00
Transfer (240 min)	\$5.25	\$5.50
Transfer (270 min)	\$5.75	\$6.00
Transfer (300 min)	\$6.25	\$6.50
Transfer (330 min)	\$6.75	\$7.00
Transfer (360 min)	\$7.25	\$7.50
Transfer (390 min)	\$7.75	\$8.00
Transfer (420 min)	\$8.25	\$8.50
Transfer (450 min)	\$8.75	\$9.00
Transfer (480 min)	\$9.25	\$9.50
Transfer (510 min)	\$9.75	\$10.00
Transfer (540 min)	\$10.25	\$10.50
Transfer (570 min)	\$10.75	\$11.00
Transfer (600 min)	\$11.25	\$11.50
Transfer (630 min)	\$11.75	\$12.00
Transfer (660 min)	\$12.25	\$12.50
Transfer (690 min)	\$12.75	\$13.00
Transfer (720 min)	\$13.25	\$13.50
Transfer (750 min)	\$13.75	\$14.00
Transfer (780 min)	\$14.25	\$14.50
Transfer (810 min)	\$14.75	\$15.00
Transfer (840 min)	\$15.25	\$15.50
Transfer (870 min)	\$15.75	\$16.00
Transfer (900 min)	\$16.25	\$16.50
Transfer (930 min)	\$16.75	\$17.00
Transfer (960 min)	\$17.25	\$17.50
Transfer (990 min)	\$17.75	\$18.00
Transfer (1020 min)	\$18.25	\$18.50
Transfer (1050 min)	\$18.75	\$19.00
Transfer (1080 min)	\$19.25	\$19.50
Transfer (1110 min)	\$19.75	\$20.00
Transfer (1140 min)	\$20.25	\$20.50
Transfer (1170 min)	\$20.75	\$21.00
Transfer (1200 min)	\$21.25	\$21.50
Transfer (1230 min)	\$21.75	\$22.00
Transfer (1260 min)	\$22.25	\$22.50
Transfer (1290 min)	\$22.75	\$23.00
Transfer (1320 min)	\$23.25	\$23.50
Transfer (1350 min)	\$23.75	\$24.00
Transfer (1380 min)	\$24.25	\$24.50
Transfer (1410 min)	\$24.75	\$25.00
Transfer (1440 min)	\$25.25	\$25.50
Transfer (1470 min)	\$25.75	\$26.00
Transfer (1500 min)	\$26.25	\$26.50
Transfer (1530 min)	\$26.75	\$27.00
Transfer (1560 min)	\$27.25	\$27.50
Transfer (1590 min)	\$27.75	\$28.00
Transfer (1620 min)	\$28.25	\$28.50
Transfer (1650 min)	\$28.75	\$29.00
Transfer (1680 min)	\$29.25	\$29.50
Transfer (1710 min)	\$29.75	\$30.00
Transfer (1740 min)	\$30.25	\$30.50
Transfer (1770 min)	\$30.75	\$31.00
Transfer (1800 min)	\$31.25	\$31.50
Transfer (1830 min)	\$31.75	\$32.00
Transfer (1860 min)	\$32.25	\$32.50
Transfer (1890 min)	\$32.75	\$33.00
Transfer (1920 min)	\$33.25	\$33.50
Transfer (1950 min)	\$33.75	\$34.00
Transfer (1980 min)	\$34.25	\$34.50
Transfer (2010 min)	\$34.75	\$35.00
Transfer (2040 min)	\$35.25	\$35.50
Transfer (2070 min)	\$35.75	\$36.00
Transfer (2100 min)	\$36.25	\$36.50
Transfer (2130 min)	\$36.75	\$37.00
Transfer (2160 min)	\$37.25	\$37.50
Transfer (2190 min)	\$37.75	\$38.00
Transfer (2220 min)	\$38.25	\$38.50
Transfer (2250 min)	\$38.75	\$39.00
Transfer (2280 min)	\$39.25	\$39.50
Transfer (2310 min)	\$39.75	\$40.00
Transfer (2340 min)	\$40.25	\$40.50
Transfer (2370 min)	\$40.75	\$41.00
Transfer (2400 min)	\$41.25	\$41.50
Transfer (2430 min)	\$41.75	\$42.00
Transfer (2460 min)	\$42.25	\$42.50
Transfer (2490 min)	\$42.75	\$43.00
Transfer (2520 min)	\$43.25	\$43.50
Transfer (2550 min)	\$43.75	\$44.00
Transfer (2580 min)	\$44.25	\$44.50
Transfer (2610 min)	\$44.75	\$45.00
Transfer (2640 min)	\$45.25	\$45.50
Transfer (2670 min)	\$45.75	\$46.00
Transfer (2700 min)	\$46.25	\$46.50
Transfer (2730 min)	\$46.75	\$47.00
Transfer (2760 min)	\$47.25	\$47.50
Transfer (2790 min)	\$47.75	\$48.00
Transfer (2820 min)	\$48.25	\$48.50
Transfer (2850 min)	\$48.75	\$49.00
Transfer (2880 min)	\$49.25	\$49.50
Transfer (2910 min)	\$49.75	\$50.00
Transfer (2940 min)	\$50.25	\$50.50
Transfer (2970 min)	\$50.75	\$51.00
Transfer (3000 min)	\$51.25	\$51.50
Transfer (3030 min)	\$51.75	\$52.00
Transfer (3060 min)	\$52.25	\$52.50
Transfer (3090 min)	\$52.75	\$53.00
Transfer (3120 min)	\$53.25	\$53.50
Transfer (3150 min)	\$53.75	\$54.00
Transfer (3180 min)	\$54.25	\$54.50
Transfer (3210 min)	\$54.75	\$55.00
Transfer (3240 min)	\$55.25	\$55.50
Transfer (3270 min)	\$55.75	\$56.00
Transfer (3300 min)	\$56.25	\$56.50
Transfer (3330 min)	\$56.75	\$57.00
Transfer (3360 min)	\$57.25	\$57.50
Transfer (3390 min)	\$57.75	\$58.00
Transfer (3420 min)	\$58.25	\$58.50
Transfer (3450 min)	\$58.75	\$59.00
Transfer (3480 min)	\$59.25	\$59.50
Transfer (3510 min)	\$59.75	\$60.00
Transfer (3540 min)	\$60.25	\$60.50
Transfer (3570 min)	\$60.75	\$61.00
Transfer (3600 min)	\$61.25	\$61.50
Transfer (3630 min)	\$61.75	\$62.00
Transfer (3660 min)	\$62.25	\$62.50
Transfer (3690 min)	\$62.75	\$63.00
Transfer (3720 min)	\$63.25	\$63.50
Transfer (3750 min)	\$63.75	\$64.00
Transfer (3780 min)	\$64.25	\$64.50
Transfer (3810 min)	\$64.75	\$65.00
Transfer (3840 min)	\$65.25	\$65.50
Transfer (3870 min)	\$65.75	\$66.00
Transfer (3900 min)	\$66.25	\$66.50
Transfer (3930 min)	\$66.75	\$67.00
Transfer (3960 min)	\$67.25	\$67.50
Transfer (3990 min)	\$67.75	\$68.00
Transfer (4020 min)	\$68.25	\$68.50
Transfer (4050 min)	\$68.75	\$69.00
Transfer (4080 min)	\$69.25	\$69.50
Transfer (4110 min)	\$69.75	\$70.00
Transfer (4140 min)	\$70.25	\$70.50
Transfer (4170 min)	\$70.75	\$71.00
Transfer (4200 min)	\$71.25	\$71.50
Transfer (4230 min)	\$71.75	\$72.00
Transfer (4260 min)	\$72.25	\$72.50
Transfer (4290 min)	\$72.75	\$73.00
Transfer (4320 min)	\$73.25	\$73.50
Transfer (4350 min)	\$73.75	\$74.00
Transfer (4380 min)	\$74.25	\$74.50
Transfer (4410 min)	\$74.75	\$75.00
Transfer (4440 min)	\$75.25	\$75.50
Transfer (4470 min)	\$75.75	\$76.00
Transfer (4500 min)	\$76.25	\$76.50
Transfer (4530 min)	\$76.75	\$77.00
Transfer (4560 min)	\$77.25	\$77.50
Transfer (4590 min)	\$77.75	\$78.00
Transfer (4620 min)	\$78.25	\$78.50
Transfer (4650 min)	\$78.75	\$79.00
Transfer (4680 min)	\$79.25	\$79.50
Transfer (4710 min)	\$79.75	\$80.00
Transfer (4740 min)	\$80.25	\$80.50
Transfer (4770 min)	\$80.75	\$81.00
Transfer (4800 min)	\$81.25	\$81.50
Transfer (4830 min)	\$81.75	\$82.00
Transfer (4860 min)	\$82.25	\$82.50
Transfer (4890 min)	\$82.75	\$83.00
Transfer (4920 min)	\$83.25	\$83.50
Transfer (4950 min)	\$83.75	\$84.00
Transfer (4980 min)	\$84.25	\$84.50
Transfer (5010 min)	\$84.75	\$85.00
Transfer (5040 min)	\$85.25	\$85.50
Transfer (5070 min)	\$85.75	\$86.00
Transfer (5100 min)	\$86.25	\$86.50
Transfer (5130 min)	\$86.75	\$87.00
Transfer (5160 min)	\$87.25	\$87.50
Transfer (5190 min)	\$87.75	\$88.00
Transfer (5220 min)	\$88.25	\$88.50
Transfer (5250 min)	\$88.75	\$89.00
Transfer (5280 min)	\$89.25	\$89.50
Transfer (5310 min)	\$89.75	\$90.00
Transfer (5340 min)	\$90.25	\$90.50
Transfer (5370 min)	\$90.75	\$91.00
Transfer (5400 min)	\$91.25	\$91.50
Transfer (5430 min)	\$91.75	\$92.00
Transfer (5460 min)	\$92.25	\$92.50
Transfer (5490 min)	\$92.75	\$93.00
Transfer (5520 min)	\$93.25	\$93.50
Transfer (5550 min)	\$93.75	\$94.00
Transfer (5580 min)	\$94.25	\$94.50
Transfer (5610 min)	\$94.75	\$95.00
Transfer (5640 min)	\$95.25	\$95.50
Transfer (5670 min)	\$95.75	\$96.00
Transfer (5700 min)	\$96.25	\$96.50
Transfer (5730 min)	\$96.75	\$97.00
Transfer (5760 min)	\$97.25	\$97.50
Transfer (5790 min)	\$97.75	\$98.00
Transfer (5820 min)	\$98.25	\$98.50
Transfer (5850 min)	\$98.75	\$99.00
Transfer (5880 min)	\$99.25	\$99.50
Transfer (5910 min)	\$99.75	\$100.00
Transfer (5940 min)	\$100.25	\$100.50
Transfer (5970 min)	\$100.75	\$101.00
Transfer (6000 min)	\$101.25	\$101.50
Transfer (6030 min)	\$101.75	\$102.00
Transfer (6060 min)	\$102.25	\$102.50
Transfer (6090 min)	\$102.75	\$103.00
Transfer (6120 min)	\$103.25	\$103.50
Transfer (6150 min)	\$103.75	\$104.00
Transfer (6180 min)	\$104.25	\$104.50
Transfer (6210 min)	\$104.75	\$105.00
Transfer (6240 min)	\$105.25	\$105.50
Transfer (6270 min)	\$105.75	\$106.00
Transfer (6300 min)	\$106.25	\$106.50
Transfer (6330 min)	\$106.75	\$107.00
Transfer (6360 min)	\$107.25	\$107.50
Transfer (6390 min)	\$107.75	\$108.00
Transfer (6420 min)	\$108.25	\$108.50
Transfer (6450 min)	\$108.75	\$109.00
Transfer (6480 min)	\$109.25	\$109.50
Transfer (6510 min)	\$109.75	\$110.00
Transfer (6540 min)	\$110.25	\$110.50
Transfer (6570 min)	\$110.75	\$111.00
Transfer (6600 min)	\$111.25	\$111.50
Transfer (6630 min)	\$111.75	\$112.00
Transfer (6660 min)	\$112.25	\$112.50
Transfer (6690 min)	\$112.75	\$113.00
Transfer (6720 min)	\$113.25	\$113.50
Transfer (6750 min)	\$113.75	\$114.00
Transfer (6780 min)	\$114.25	\$114.50
Transfer (6810 min)	\$114.75	\$115.00
Transfer (6840 min)	\$115.25	\$115.50
Transfer (6870 min)	\$115.75	\$116.00
Transfer (6900 min)	\$116.25	\$116.50
Transfer (6930 min)	\$116.75	\$117.00
Transfer (6960 min)	\$117.25	\$117.50
Transfer (6990 min)	\$117.75	\$118.00
Transfer (7020 min)	\$118.25	\$118.50
Transfer (7050 min)	\$118.75	\$119.00
Transfer (7080 min)	\$119.25	\$119.50
Transfer (7110 min)	\$119.75	\$120.00
Transfer (7140 min)	\$120.25	\$120.50
Transfer (7170 min)	\$120.75	\$121.00
Transfer (7200 min)	\$121.25	\$121.50
Transfer (7230 min)	\$121.75	\$122.00
Transfer (7260 min)	\$122.25	\$122.50
Transfer (7290 min)	\$122.75	\$123.00
Transfer (7320 min)	\$123.25	\$123.50
Transfer (7350 min)	\$123.75	\$124.00
Transfer (7380 min)	\$124.25	\$124.50
Transfer (7410 min)	\$124.75	\$125.00
Transfer (7440 min)	\$125.25	\$125.50
Transfer (7470 min)	\$125.75	\$126.00
Transfer (7500 min)	\$126.25	\$126.50
Transfer (7530 min)	\$126.75	\$127.00
Transfer (7560 min)	\$127.25	\$127.50
Transfer (7590 min)	\$127.75	\$128.00
Transfer (7620 min)	\$128.25	\$128.50
Transfer (7650 min)	\$128.75	\$129.00
Transfer (7680 min)	\$129.25	\$129.50
Transfer (7710 min)	\$129.75	\$130.00
Transfer (7740 min)	\$130.25	\$130.50
Transfer (7770 min)	\$130.75	\$131.00
Transfer (7800 min)	\$131.25	\$131.50
Transfer (7830 min)	\$131.75	\$132.00
Transfer (7860 min)	\$132.25	\$132.50
Transfer (7890 min)	\$132.75	\$133.00
Transfer (7920 min)	\$133.25	\$133.50
Transfer (7950 min)	\$133.75	\$134.00
Transfer (7980 min)	\$134.25	\$134.50
Transfer (8010 min)	\$134.75	\$135.00
Transfer (8040 min)	\$135.25	\$135.50
Transfer (8070 min)	\$135.75	\$136.00
Transfer (8100 min)	\$136.25	\$136.50
Transfer (8130 min)	\$136.75	\$137.00
Transfer (8160 min)	\$137.25	\$137.50
Transfer (8190 min)	\$137.75	\$138.00
Transfer (8220 min)	\$138.25	\$138.50
Transfer (8250 min)	\$138.75	\$139.00
Transfer (8280 min)	\$139.25	\$139.50
Transfer (8310 min)	\$139.75	\$140.00
Transfer (8340 min)	\$140.25	\$140.50

Appendix A: Artwork

Real-Time Information Display Systems

Display artwork will be worked out within the requirements of the electronic medium. The Regional Transit Hub Standards and Guidelines can be found at the following address: <http://www.mtc.ca.gov/planning/tcip/>

 511 Transit Departures for AC Transit, BART, & VTA		10:45 AM
 AC Transit	Agency-specific emergency message. Agency-specific emergency messa...	Departing
99	to Bay Fair BART	8, 38, 68 min
212	to New Park Mall @ Civic... <i>Buses are temporarily out of service due to... Buses are tempo...</i>	23, 53, 83 min
215	to Fremont Blvd. & Landing... <i>Buses are temporarily out of service due to... Buses are te...</i>	38, 88 min
216	to Union City BART	7, 67 min
216	to New Park Mall @ Civic... <i>Buses are temporarily out of service due to... Buses are tempo...</i>	50 min
217	to Great Mall Transit Center, Milpitas (VTA Light Rail)	30, 60, 90 min
232	to Ohlone College Newark Campus	22, 82 min
239	to Warm Springs Blvd. & Dixon Landing Rd.	40, 85 min
242	CW loop, returning to Fremont BART @ Civic Center Dr. & Bart Way	10, 40, 70 min
242	CCW loop, returning to Fremont BART	10, 40, 70 min
251	CW loop, returning to Fremont BART	10, 40, 70 min
251	CCW loop, returning to Fremont BART	10, 40, 70 min
332	to New Park Mall (Weekends only) @ Civic Center Dr. & Bart Way	4:30pm, 8:30pm
333	to Union City BART via Newark @ Civic Center Dr. & Bart Way	10:30pm, 11:30pm
 <i>Call 511 or visit 511.org for more free real-time departures.</i>		Page 1 of 3

1 Type R-Real-Time Information
NTS

Appendix B:
FONTS



APPENDIX B: Fonts

Frutiger 45 Light

ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
1234567890.,/-!?!&

Frutiger 46 Light Italic

ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
1234567890.,/-!?!&

Frutiger 47 Light Condensed

ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
1234567890.,/-!?!&

Frutiger 55 Roman

ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
1234567890.,/-!?!&

APPENDIX B: Fonts

Frutiger 56 Italic

ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
1234567890.,/-!?!&

Frutiger 57 Condensed

ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
1234567890.,/-!?!&

Frutiger 65 Bold

ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
1234567890.,/-!?!&

Frutiger 66 Bold Italic

ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
1234567890.,/-!?!&

APPENDIX B: Fonts

Frutiger 67 Bold Condensed

ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
1234567890.,/-!?!&

Frutiger 75 Black

ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
1234567890.,/-!?!&

Frutiger 76 Black Italic

ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
1234567890.,/-!?!&

Frutiger 77 Black Condensed

ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
1234567890.,/-!?!&

APPENDIX B: Fonts

Frutiger 87 Extra Black Condensed

ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
1234567890.,/-!?!&

Appendix C:
**STANDARD
SPECIFICATIONS**

REGIONAL TRANSIT WAYFINDING STANDARD SPECIFICATIONS

SECTION 05 70 00

DECORATIVE METAL

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Stainless steel composite panels
- B. Transit information display (TID) and exit directory cases and frames (otherwise known as map, schedule, and advertising cases).
- C. Other decorative metal work.

1.02 RELATED SECTIONS

- A. Welding of stainless steel is specified in Section 05 05 22 - Metal Welding.

1.03 MEASUREMENT AND PAYMENT

- A. General: Measurement and payment for decorative metal work will be either by the lump-sum method or by the unit-price method as determined by the listing of the bid item for post and panel wayfinding units indicated in the Bid Schedule of the Bid Form in accordance with Division 01 – General Requirements provisions regarding price and payment procedures. Prices shall include base plate, anchor bolts, and footing, as applicable to specific installation.
- B. Prototype: Measurement and payment for prototypes will be by the lump-sum method as indicated in the Bid Schedule of the Bid Form in accordance with Division 01 – General Requirements provisions regarding price and payment procedures. If no prototype is required, no payment will be made for the lump sum for the prototype. No other adjustment will be made to the Contract Price.

1.04 REFERENCES

- A. American National Standards Institute (ANSI):
 - 1. ANSI Z97.1 Safety Glazing Materials Used in Buildings, Safety Performance Specifications and Methods of Test
- B. ASTM International (ASTM):
 - 1. ASTM A240 Specification for Heat-Resisting Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications

2. ASTM A269 Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service
3. ASTM A312 Specification for Seamless, Welded, and Heavily Cold Worked Austenitic Stainless Steel Pipe
4. ASTM A480 Specification for General Requirements for Flat-Rolled Stainless and Heat-Resisting Steel Plate, Sheet, and Strip
5. ASTM C1048 Specification for Heat-Treated Flat Glass-Kind HS, Kind FT Coated and Uncoated Glass
6. ASTM F593 Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs
7. ASTM F594 Specification for Stainless Steel Nuts
8. ASTM F837 Specification for Stainless Steel Socket Head Cap Screws
9. ASTM F879 Specification for Stainless Steel Button and Flat Countersunk Head Cap Screws
10. ASTM F880 Specification for Stainless Steel Socket-Set Screws

C. Code of Federal Regulations (CFR):

1. Title 16, Part 1201, Safety Standard for Architectural Glazing Materials (16 CFR 1201)

D. Glass Association of North America (FGMA):

1. FGMA Glazing Manual

E. National Association of Architectural Metal Manufacturers (NAAMM):

1. AMP 500 Metal Finishes Manual

F. Specialty Steel Industry of North America (SSINA):

1. "Designer Handbook"

1.05 SUBMITTALS

- A. General: Refer to Division 01 – General Requirements provisions regarding submittal procedures, shop drawings, product data and samples.
- B. Shop Drawings: Submit detailed Shop Drawings of decorative metalwork, showing sizes and dimensions, materials, details of fabrication and construction, locations of hardware, anchors, mounting hardware, and accessories, and installation details.
- C. Product Data: Submit manufacturers' product data of manufactured items and for miscellaneous hardware items associated with decorative metalwork.
- D. Samples: Submit samples of stainless steel finishes for the different locations. Pipe and tube shall be submitted in 10-inch lengths; sheet shall be submitted in 8-inch by 10-inch size.
- E. Selected decorative metal components shall match the Engineer's control samples in quality of fabrication, joinery, welding, and finish.

- F. Submit structural calculations for freestanding TID cases, including wind loadings prepared by a professional Engineer registered in California and having a record of successful experience providing engineering services for installations similar in design and scope to the work of this Section. Include structural calculations for each unit's anchorage to ground, including anchor bolts, footing, and base plate, as applicable. The pipe-to-base plate weld shall develop the complete strength of the pipe where connected to the plate (such as a properly executed Complete Joint Penetration weld would do).

1.06- QUALITY ASSURANCE

- A. Work Quality:
1. Shop and field work shall be performed by mechanics, craftspersons, artisans, and workers skilled and experienced in the fabrication and installation of the decorative metalwork involved.
 2. Stainless steel work shall conform to the quality requirements of the herein referenced
 3. Specialty Steel Industry of North America, "Designer Handbook" series standards.
- B. Iron Contamination (Rust): Stainless steel with iron contamination will not be accepted. Dies for forming stainless-steel components shall be stainless steel or chrome-plated to prevent embedment of minute iron particles. All stainless-steel work shall be polished and cleaned after fabrication and installation to prevent rusting susceptibility.
- C. Welds of Stainless Steel: Exposed welds shall be ground smooth and polished to match the adjacent surrounding finish of the stainless steel.
- D. Regulatory Requirements: Glass and glazing shall comply with applicable requirements of the California Building Code, ANSI Z97.1, and 16 CFR 1201.
- E. Contractor's Professional Engineer's Qualifications: Upon the Engineer's request, provide a reference list with client contact information. List shall show that the engineer has a record of successful experience providing engineering services for installations similar in design and scope to the work of this Section.
- F. Prototype: Upon Engineer's request, build prototype or prototypes to demonstrate aesthetic effects and verify and set aesthetics and quality standards for fabrication and installation. Modify prototype and shop drawings as required by Engineer in order to obtain Engineer's approval. Approved prototype may become part of the completed Work with the Engineer's written permission. Either deliver prototype to location indicated by the Engineer or make available for Engineer's review at Contractor or fabricator's facility within 50 miles from the San Francisco Bay or from the project site.

1.07 DELIVERY, STORAGE AND HANDLING

- A. Handle products and materials in accordance with manufacturer's instructions. Store in a dry and secure location, protected against direct sunlight and excessive heat.

1.08 WARRANTY

- A. Provide manufacturer's standard warranty.

- B. Warranty terms: In accordance with the Contract Documents. In no case shall warranty against defects in materials and workmanship be less than one year from date of project acceptance.

1.07 MAINTENANCE TOOLS

- A. Provide a minimum of three keys for each TID to the Engineer.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Stainless Steel Tube or Pipe: Provide stainless steel tube or pipe, where indicated, conforming to ASTM A269, Grade TP316, or ASTM A312, Grade TP316, of diameters and sizes indicated. Provide tube or pipe with a polished finish similar to NAAMM No. 4 stainless steel finish.
- B. Stainless Steel Sheet and Plate: ASTM A240 and ASTM A480, Type 316, of thickness indicated on the Contract Drawings, with ASTM A480 or NAAMM 500, No. 4 stainless steel finish.
- C. Anchor Plates: Provide stainless steel anchor plates conforming to ASTM A240 and ASTM A480, Type 316, with ASTM A480 or NAAMM 500, No. 4 stainless steel finish.
- D. Welding Rod/Electrodes: Welding electrodes and welding rods for stainless steel shall conform to AWS A5.4 and AWS A5.9 as recommended by their manufacturers for the positions and other conditions of actual use. Matching filler metals shall be compatible with the Type 316 or Type 304 stainless steel, as applicable.
- E. Anchors, Fasteners, and Accessories: Provide all required anchors, fasteners, miscellaneous components, and accessories as required for complete and finished decorative metal installations. Bolts, studs, and nuts shall conform to ASTM F593, F594, F837, F879, and F880 as applicable, Type 316. Comply also with applicable requirements of SSINA's "Stainless Steel Fasteners." Anchors and fasteners shall be tamper-resistant where exposed.
1. Self-Tapping Screws, Washers and Shims: Oval head, counter-sunk phillips self-tapping screws, washers, and horseshoe shims shall consist of a 316 stainless steel alloy.
 2. Expansion Bolts: Provide stainless steel expansion type anchors with matching stainless steel bolts or studs with nuts, of sizes as indicated or required to meet installation conditions. Provide stainless steel washers under all bolt heads and nuts. Expansion bolts will not be permitted for use on concrete curbs or along the edge of concrete or a concrete joint.
- F. Grout: As proposed by the Contractor and approved by the Engineer.
- G. Glass: Clear Tempered Glass: ASTM C1048, Type 1 transparent flat, Quality Q3, Kind FT fully tempered, Condition A uncoated, float glass with horizontal tempering.

1. Tempered glass shall bear the manufacturer's identification as to type and thickness. Such identification for glazing shall be permanently etched so as to be visible after glass has been installed.

H. Glazing Materials: Glazing materials shall conform to applicable requirements of FGMA Glazing Manual.

I. Provide a ferromagnetic laminate coating bonded to the stainless steel bent plate of the TIDs. The laminate shall serve as the internal backing material for the TIDs.

J. Install Grip A Strip rail or approved equal in the TID cases to attach and hold the maps firmly inside the TID case. The rail shall be mounted permanently to the TID case using the manufacturer supplied mounting brackets.

2.02 ACCESSORIES

A. Hinge: Stainless steel full length, heavy-duty piano-type, meeting the requirements of ASTM A240 and ASTM A480, Type 316, minimum 14 gage.

B. Lock: Cylinder type, CAT 74. Comply with the Engineer's control sample.

2.03 FABRICATION - GENERAL

A. The transit information display shall be a static, interior and exterior, pole or wall mounted structure with several different possible assembly options including the installation of real-time displays. Refer to the Contract Drawings for details on the different assembly options.

B. The TID assembly shall incorporate proper venting to allow proper air flow and weep holes with insect screens for proper water drainage. Proper gasketing also shall be incorporated so as to eliminate water entry into cabinet.

C. Fabricate TIDs to comply with requirements indicated for materials, thickness, finishes, colors, designs, shapes, sizes and details of construction as shown on the Contract Drawings.

D. TID Locking Mechanism and Keying: TID locks shall be keyed locks; combination locks are not acceptable. Locks on a single unit shall be keyed the same. Other requirements regarding keying shall be as required by the Engineer.

E. Decorative metalwork shall be fabricated by firms or shops experienced and skilled in the custom fabrication of architectural decorative metalwork. Form and fabricate the work as indicated and as required to meet installation conditions.

F. Bends in tubes or pipes shall be precision-formed to a smooth continuous radius by skilled workers, true to detail. Butt joints shall have tight-fitting internal pipe sleeve or dowel.

G. Stainless steel welded connections shall be made in accordance with applicable requirements of AWS D10.4.- Welding shall be performed in the shop unless otherwise indicated. Welded joints

shall be ground and dressed smooth to match adjacent surfaces and so that the shape and profile of the item welded is maintained and so that the weld seam is invisible in the finished work. Ends shall be closed with matching material, welded, and ground smooth. Welds shall be ground and polished to match NAAMM 500, No. 4 stainless steel finish.

- H. Corners: Where rounding of 90-degree, outside corners are shown on the Contract Drawings, provide one-quarter sphere components for rounding of 90-degree, outside railing corners. Sphere components shall be welded into position, and the weldments shall be ground and dressed smooth so as to be invisible in the finished work.
- I. Decorative metalwork shall be prefabricated and preassembled in the factory or shop as far as practicable.
- J. All stainless steelwork, after receiving NAAMM 500, No. 4 stainless steel finish, shall receive a final polishing using non-ferrous grit no coarser than 180.
- K. Glazing: Glazing methods shall conform to applicable requirements of FGMA Glazing Manual.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Install decorative metalwork as indicated and in accordance with the approved Shop Drawings, using workers skilled and experienced in the installation of the type of work involved.
- B. Install decorative metalwork true and horizontal, perpendicular, or at the required angle, as the case may be, level and square, with angles and edges parallel with related lines of the building or structure.
- C. Field welding, where required, shall conform to requirements specified herein for shop welding under "Fabrication." All welds shall be ground and polished smooth to match adjacent finish surfaces.

3.02 CLEANING OF STAINLESS STEEL

- A. All stainless steelwork shall be cleaned of all dirt, dust, oil and grease, fingerprints, atmospheric and aqueous corrosion, and iron contamination, rinsed with clear water, and then polished before the Engineer's final inspection that establishes Substantial Completion of the Contract.
- B. The cleaning method shall be the mildest treatment necessary for the problem.
- C. Corrosion shall be removed by scouring lightly with an abrasive cleaner, rubbing in the direction of the finish grain of the metal. In cases of extreme discoloration, use scouring sponges or steel wool, made only from stainless steel, and then rinsed thoroughly with clean water.
- D. Iron contamination shall be removed by passivation, a chemical cleaning method involving the use of nitric acid. This cleaning method shall be performed in the shop only, unless no other treatment at the site is successful. Passivation treatment at the site shall be performed under the continuous supervision of the stainless steel fabricator, employing all required safety precautions and protection of adjacent surfaces.

DECORATIVE METAL

- E. Weldments may require additional fine grinding to remove corrosion or iron contamination if no other cleaning method is successful.
- F. All cleaned and rinsed stainless steelwork shall be dried with clean towels and then polished by buffing. If a dull or satin finish is indicated, then buff only enough to remove any remaining residue.

END OF SECTION 05 70 00

REGIONAL TRANSIT WAYFINDING STANDARD SPECIFICATIONS

SECTION 10 14 27

POST AND PANEL WAYFINDING SYSTEM

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Signage and information system (“kiosk”).

1.02 MEASUREMENT AND PROCEDURES

- A. General: Measurement and payment for post and panel wayfinding units will be either by the lump-sum method or by the unit-price method as determined by the listing of the bid item for post and panel wayfinding units indicated in the Bid Schedule of the Bid Form in accordance with Division 01 – General Requirements provisions regarding price and payment procedures. Prices shall include base plate, anchor bolts, and footing, as applicable to specific installation.
- B. Prototype: Measurement and payment for post and panel wayfinding prototype will be by the lump-sum method as indicated in the Bid Schedule of the Bid Form in accordance with Division 01 – General Requirements provisions regarding price and payment procedures. If no prototype is required, no payment will be made for the lump sum for the prototype. No other adjustment will be made to the Contract Price.

1.03 SUBMITTALS

- A. General: Refer to Division 01 – General Requirements provisions regarding submittal procedures, shop drawings, product data and samples.
- B. Submit shop drawings and manufacturer’s technical literature. Include manufacturer’s toll-free telephone number for product support.
- C. Submit half-size laser print outs of graphics for each kiosk face for approval.
- D. Submit structural calculations including wind loadings prepared by a professional Engineer registered in California and having a record of successful experience providing engineering services for installations similar in design and scope to the work of this Section. Include structural calculations for each unit’s anchorage to ground including anchor bolts, footing, and base plate, as applicable. The pipe-to-base plate weld shall develop the complete strength of the pipe where connected to the plate (such as a properly executed Complete Joint Penetration weld would do).

1.04 QUALITY ASSURANCE

- A. Manufacturer Qualifications:

- 1. Minimum 8 years’ experience in the manufacture of signage and information systems.

2. Upon Engineer's request, provide reference list and photos of at least 10 public or commercial exterior projects currently using signage and information systems supplied by the manufacturer.
- B. Contractor's Professional Engineer's Qualifications: Upon the Engineer's request, provide a reference list with client contact information. List shall show that the engineer has a record of successful experience providing engineering services for installations similar in design and scope to the work of this Section.
- C. Prototype: Upon Engineer's request, build prototype to demonstrate aesthetic effects and verify and set quality standards for fabrication and installation. Modify prototype and shop drawings as required by Engineer in order to obtain Engineer's approval. Approved prototype may become part of the completed Work with the Engineer's written permission. Either deliver prototype to location indicated by the Engineer or make available for Engineer's review at Contractor or fabricator's facility within 50 miles from the San Francisco Bay or from the project site.

1.05 DELIVERY, STORAGE AND HANDLING

- A. Handle products in accordance with manufacturer's instructions. Store in dry, secure location, protected against direct sunlight and excessive heat.

1.06 WARRANTY

- A. Provide manufacturer's standard warranty.
- B. Warranty terms: In accordance with the Contract Documents. In no case shall warranty against defects in materials and workmanship be less than one year from date of project acceptance ~~delivery~~.

1.07 MAINTENANCE TOOLS

- A. Provide a minimum of three keys for each kiosk to the Engineer.

PART 2 - PRODUCTS

2.01 GENERAL

- A. Post-mounted double-sided signage and information system with signage elements consisting of curved face panels attached to a rigid internal structure.
 1. Suitable for all-weather outdoor use.
 2. At Contractor's option, kiosk may be fabricated from stainless steel in lieu of aluminum shown on the Contract Drawings. Where stainless steel is utilized in lieu of aluminum for the exterior of kiosk, stainless steel shall be Type 316.
 3. Provide graphics on both sides of unit. Refer to Article entitled "Artwork" herein.

- a. Provide screen-printed graphics and applied vinyl graphics at the top portion of both sides of the exterior of the unit. Other methods of applying graphics which meet or exceed the specified method in weather, chemical, graffiti, and ultraviolet light resistance may be acceptable to the Engineer.
 - b. Graphics sheet insert for the inside of unit behind each window will be furnished and installed by the Engineer or others
4. Provide cutout with .125" clear lexan window material attached to door panel with studs and nuts, ~~clear polycarbonate or acrylic window~~ and insert carrier for graphics display on each side of each signage assembly.
- a. Panels with window cutouts shall include continuous stainless steel hinges and locking mechanisms for access to interior.
 - b. Window shall be retained in window opening using slots provided in the curved face panel's edge profile or by other means per approved shop drawings.
 - c. Provide minimum 0.06 inch thick aluminum graphic panel, powder coated white to accept graphic sheet insert.
 - d. Locking Mechanism and Keying: Locks shall be keyed locks; combination locks are not acceptable. Locks on a single unit shall be keyed the same. Other requirements regarding keying shall be as required by the Engineer.
5. Provide Type 316 stainless steel base plates and anchor bolts. Pole welded to base plate shall be Type 316 stainless steel.

B. Curved Face Panels:

1. Material: Aluminum, 0.125 inch minimum thickness.
2. Provide curved face panels. Edges shall be internal and completely concealed from view in the assembled signage unit.

C. Internal Structure and End Plates:

1. Provide an internal structure sufficient to support sides of kiosk and end and face panels and to ensure that kiosk unit remains centered and secured to pole. Internal structure shall be one piece extrusion or welded module.
2. Center Support Plate or Plates, as Applicable: Aluminum plate, minimum 0.25 inch thickness.
3. End plates: Aluminum plate, thickness as determined by structural design.

- D. Bird Control Wire: Bird barrier shall be designed for all bird species consisting of wire spikes on a base strip, 4 inches high, 4 inches wide, consisting of no less than 120 wire points per foot, providing full 180-degree wire coverage. Wire Spikes: Stainless steel, 0.041 inch diameter, full-hard spring temper, 250,000 lbs./in. tensile strength. Base Strip: Stainless steel, 0.25 inch wide x 0.02 inch thick, fully annealed for flexibility and surface shape memory. Similar stainless steel systems may be acceptable subject to the approval of the Engineer.
- E. Weatherproofing: Provide gasketing for exterior use. Provide for ventilation of interior, and provide weep holes and vents with insect screens.
- F. Security: Provide tamper-resistant stainless steel security screws to prevent unauthorized removal of curved face panels. Security screws shall be countersunk flush with the frame's formed or fabricated edge. Welded construction may be utilized in lieu of external security fasteners.
- G. Finish of Exposed Surfaces Including Curved Face Panels, Sides, End Plates, Mounting Pole, and Base Plate: Manufacturer's graffiti resistant polyester powder coat with anti-graffiti coating.
 - 1. Colors: As indicated in the Contract Documents.

2.02 FABRICATION

- A. Factory assemble units and apply finishes and graphics in accordance with manufacturer's standards and approved shop drawings.
- B. Weld post to base plate. Base plate shall be perpendicular to post within plus or minus one degree.

2.03 ARTWORK

- A. Unless otherwise specified in the Contract Specifications, the Engineer will furnish electronic files showing the required logos, fonts, and layout of typical sign for use by the Contractor. The Contractor shall furnish graphic design services to design each sign face. The software of the artwork file will be as designated in the Contract Specifications.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify that substrates are stable and capable of supporting the weight of signage units.
- B. Verify that substrates have been adequately prepared to securely anchor signage units.

3.02 PREPARATION

- A. Clean surfaces thoroughly prior to installation.

- B. Protect surrounding finishes and fixtures from damage by work of this Section

3.03 INSTALLATION

- A. Install in accordance with manufacturer's installation instructions.
- B. Install in accordance the details shown in the Contract Drawings and approved shop drawings.

3.04 CLEANING AND PROTECTION

- A. Clean exposed surfaces in accordance with manufacturer's instructions.
- B. Protect exposed surfaces from damage by subsequent construction.

END OF SECTION 10 14 27

REGIONAL TRANSIT WAYFINDING STANDARD SPECIFICATIONS

SECTION 10 14 33

ILLUMINATED CABINET SIGNAGE

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Exterior and interior illuminated overhead hanging and wall-mounted signs.
- B. Exterior and interior non-illuminated wall-mounted and signs post-mounted.

1.02 MEASUREMENT AND PAYMENT

- A. Separate measurement and payment will not be made for work required under this Section. All costs in connection with the work specified herein will be considered to be included with the related item of work in the Bid Schedule of the Bid Form, or incidental to the Work.
- B. Prototype: Measurement and payment for illuminated cabinet prototype will be by the each as indicated in the Bid Schedule of the Bid Form in accordance with Division 01 – General Requirements provisions regarding price and payment procedures. If no prototypes required, no payment will be made for prototypes. No other adjustment will be made to the Contract Price.

1.03 REFERENCES

- A. The applicable date of reference standards shall be understood to be the date of the Invitation to Bid.
- B. American Architectural Manufacturers Association (AAMA):
 - 1. AAMA 2603 Voluntary Specification and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels.
- C. American Society for Testing and Materials (ASTM):
 - 1. ASTM B123 Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
 - 2. ASTM B153 Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware

3. ASTM B209 Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate
4. ASTM B221 Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes

D. Americans with Disabilities Act (ADA)

E. Association Connection Electronic Industries (IPC):

1. IPC 2221 Generic Standard on Printed Board Design
2. IPC 2222 Sectional Design Standard for Rigid Organic Printed Boards

F. Federal Specifications:

1. QQ-S-571F Solder, Electronic: Fluxed and Non-Fluxed Solders

G. National Electrical Manufacturers Association (NEMA):

1. LI-1 Industrial Laminated Thermosetting Products.

H. National Fire Protection Association (NFPA):

1. NFPA 70 National Electrical Code (NEC).

I. Society For Protective Coatings (SSPC):

1. SSPC SP6/NACE No. 3 Commercial Blast Cleaning

1.04 SUBMITTALS

A. General: Refer to Division 01 – General Requirements provisions regarding submittal procedures, shop drawings, product data and samples.

B. Product Data: For each type of product indicated.

C. Shop Drawings: Show fabrication and installation details for signs and mounting devices.

1. Show sign mounting heights, materials, locations of supports, mountings and accessories.
2. Provide message list, typestyles, graphic elements, and layout for each sign.
3. Submit half-size laser print outs of each sign face for approval.
4. Wiring Diagrams: Power and control wiring.

D. Samples: Submit the following samples for verification:

1. Corner of aluminum frame showing mitered and welded corner with finish, each leg of corner a minimum of 8 inches long.
2. Acrylic sheet, 8 by 10 inches.
3. Acrylic sheet with translucent and opaque finish; for both interior and exterior, as applicable, 8 by 10 inches.
4. Samples of translucent film in each color required.

E. Calculations: Submit structural calculations including wind and vibration loadings prepared by a professional Engineer registered in California with a record of successful experience providing engineering services for installations similar in design and scope to the work of this Section. Include structural calculations for unit's anchorage.

F. Prototype: As many as one prototype for each sign type, upon Engineer's request.

1.05 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with applicable provisions in ADA-ABA Accessibility Guidelines and CBC.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

C. Contractor's Professional Engineer's Qualifications: Upon the Engineer's request, provide a reference list with client contact information. List shall show that the engineer has a record of successful experience providing engineering services for installations similar in design and scope to the work of this Section.

D. Fabricator Qualifications

1. Minimum 5 years of experience in the fabrication of illuminated signage.
2. Upon Engineer's request, provide reference list and photos of at least 10 public or commercial projects currently using illuminated signage made by the fabricator.

E. Powder-Coating Applicator Qualifications: A firm experienced in successfully applying powder coatings of type indicated and employing competent control personnel to conduct continuing, effective quality-control program to ensure compliance with requirements.

F. Prototype: The Engineer at the Engineer's discretion may require prototypes of any or all sign types. Upon Engineer's request, build prototype of each specific sign type requested

to demonstrate aesthetic effects and verify and set aesthetic and quality standards for fabrication and installation. Modify prototype and shop drawings as required by Engineer in order to obtain Engineer's approval. Approved prototype may become part of the completed Work with the Engineer's written permission. Either deliver prototype to location indicated by the Engineer or make available it for Engineer's review at Contractor or fabricator's facility within 50 miles from the San Francisco Bay or from the project site.

1.06 DELIVERY, STORAGE AND HANDLING

- A. Deliver, store, and handle materials in accordance with manufacturer's instructions. Store in dry, secure location, protected against direct sunlight and excessive heat.

1.07 WARRANTY

- A. Provide manufacturer's standard warranty.
- B. Warranty terms: In accordance with the Contract Documents. In no case shall warranty against defects in materials and workmanship be less than one year from date of project acceptance.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Aluminum Sheet and Plate: ASTM B 209, alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated, and with at least the strength and durability properties of Alloy 5005-H32.
- B. Aluminum Extrusions: ASTM B 221, alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated, and with at least the strength and durability properties of Alloy 6063-T5.
- C. Acrylic Sheet: Acrylite GP 015-2 P-95, translucent white, as manufactured by Evonik Industries, or equal. UV resistant and light diffusing sheet.
- D. Applied Vinyl: 3M Scotchcal Translucent Graphic Film Series 3630 or equal, cast vinyl film for both interior and exterior use for internally illuminated signs approved by film manufacturer for application to substrate. Film shall have matte surface finish with uniform color in both reflected and transmitted light; clear, permanent, pressure-sensitive adhesive; and a translucent synthetic liner. Thickness of film without adhesive: 2 mils. Overall thickness of film: 3-4 mils. Tensile strength: 5 pounds/inch at 73 degrees F. Chemical resistance: Resists mild alkalis, mild acids, and salt. Refer to Article entitled "Cabinet Signs" in this Section for use of this film.
- E. Applied Vinyl with Protective Top Coat: 3M Scotchcal Translucent Graphic Film Series 3632 GPS or equal. For detailed specifications for this film, refer to "Applied Vinyl"

herein for Series 3630 with the addition of protective top coat. Low-sheen finish. Refer to Article entitled “Cabinet Signs” in this Section for use of this film.

- F. Paint: Matthews Acrylic Polyurethane, or equal. Multi-component opaque paint material consisting of pigmented base and activator. UV resistant, satin sheen. Use primer and undercoats as recommended in writing by paint manufacturer for specific substrate.
- G. Gaskets and Seals: Provide neoprene gaskets as indicated on the Contract Drawings.
- H. Bird Control Components:
 1. Posts, springs, and accessories fabricated from Type 316 stainless steel.
 2. Wire: Braided stainless steel wire coated with ultraviolet stabilized nylon coating.

2.02 CABINET SIGNS

- A. Brackets: Fabricate brackets and fittings for wall-mounted signs from extruded aluminum to suit cabinet sign construction and mounting conditions indicated. Fabricate pendants for overhead-mounted signs as indicated on the Contract Drawings. Factory paint or powder coat brackets in color indicated. Powder coat pendants and related hardware as indicated on the Contract Drawings.
- B. Cabinet Sign Frames: Extruded-Aluminum Frames: Mitered with concealed anchors and welded.
- C. Panel Material: White translucent acrylic Sheet.
- D. Artwork Materials:
 1. Interior Sign Panels: Translucent and opaque areas of interior sign panels shall be applied vinyl sheet.
 2. Exterior Sign Panels: Opaque areas of exterior sign panels shall be painted.
 3. Translucent portions of exterior signs shall be vinyl sheet with protective top coat.

2.03 ACCESSORIES

- A. Anchors and Inserts: Provide stainless steel anchorages. Refer to Contract Drawings for specific anchors.
- B. Design and selection of anchors for overhead applications and subjected to sustained tensile loads where failure of the anchor could result in risk to life or limb shall comply with the following requirements: Such anchors shall be embedded in confined concrete. Length of embedment in unconfined concrete shall not be considered effective embedment length. Use of adhesive anchors is prohibited.

2.04 ELECTRICAL

A. Light Fixtures: Lumileds Rebel LED modules, or equal, with the following additional requirements:

1. The LED shall be rated 100 lumens per watt, mounted on and driven by a light engine module capable of delivering 195 lumens at 1.0A in a constant-current configuration.
2. The LED shall be provided with gold-plated pins to be inserted into sockets embedded in the light engine module. Alternately, the LED and the light engine module may be integrated on a printed circuit board (PCB) as shown on the Contract Drawings. The integrated module shall be provided with gold-plated pins to be inserted into sockets embedded in an interface base module. The base module shall be provided with soldering points for external copper wires.
3. In either configuration, the pins of the LED or the integrated module shall be rigid for the LED or the module to be easily extracted without incurring damage to the pins or degrading the electrical contact. The integrated module shall plug into spacers on the base module for physical support.
4. PCBs shall be constructed with epoxy glass reinforcement with plated through holes and shall meet the following standards: NEMA LI-1, Grade FR-4 (peel strength load limit of 5), IPC-2221 and 2222 relating to the copper traces, and Federal Specifications QQ-S-571 pertaining to the use and application of solder. All circuit sides shall be shielded against electrical short circuits and contact with metal objects.

B. Low Voltage Power Supply. As indicated or as selected and approved for power source.

C. Low Voltage Emergency Exit Power Supply. As indicated in the Contract Drawings, or as selected and approved for power source.

2.05 FABRICATION

A. General: Provide Signs of configurations indicated.

1. Welded Connections: Comply with AWS standards for recommended practices in shop welding. Provide welds behind finished surfaces without distortion or discoloration of exposed side. Clean exposed welded surfaces of welding flux and dress exposed and contact surfaces.
2. Mill joints to tight, hairline fit. Form joints exposed to exclude water penetration.

3. Form joints to eliminate light leaks. Provide gasketing and seals where indicated on the Contract Drawings and as required to ensure weather-tight assembly.
 4. Conceal fasteners if possible; otherwise, locate fasteners where they will be inconspicuous.
- B. Shop assemble units and apply finishes and graphics in accordance with the Contract Drawings, manufacturer's standards and approved shop drawings.

2.06 ARTWORK

- A. Unless otherwise specified in the Contract Specifications, the Engineer will furnish electronic files showing the required logos, fonts, and layout of typical sign for use by the Contractor. The Contractor shall furnish graphic layout services to layout each sign face.

2.07 ALUMINUM FINISHES

- A. Paint or powder-coat finish, at fabricator's option.
- B. Paint Finish: Acrylic polyurethane paint as specified herein.
- C. Powder-Coat Finish: AAMA 2603 except with a minimum dry film thickness of 1.5 mils. Comply with coating manufacturer's written instructions for cleaning, conversion coating, and applying and baking finish.
- D. Color and Gloss:
1. Typical: Black, satin gloss.
 2. Interior of Box: White, reflective.

2.08 STEEL FINISHES

- A. Galvanizing: Hot-dip galvanize products made from rolled, pressed, and forged steel shapes, castings, plates, bars, and strips indicated to be galvanized to comply with ASTM A 123.
1. Hot-dip galvanize steel and iron hardware indicated to be galvanized to comply with ASTM A 153.
 2. Do not quench or apply post-galvanizing treatments that might interfere with paint adhesion.
- B. Powder-Coat Finish: Prepare, treat, and coat non-galvanized ferrous metal to comply with resin manufacturer's written instructions and as follows:

1. Prepare uncoated ferrous-metal surfaces to comply with SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
 2. Apply thermosetting polyester or acrylic urethane powder coating with cured-film thickness not less than 1.5 mils or resin manufacturer's recommended thickness, whichever is greater.
 3. Color and Sheen: Black, satin.
- C. Powder-Coat Finish: Prepare, treat, and coat galvanized metal to comply with resin manufacturer's written instructions and as follows:
1. Prepare galvanized metal by thoroughly removing grease, dirt, oil, flux, and other foreign matter.
 2. Treat prepared metal with zinc-phosphate pretreatment, rinse, and seal surfaces.
 3. Apply thermosetting polyester or acrylic urethane powder coating with cured-film thickness not less than 1.5 mils or resin manufacturer's recommended thickness, whichever is greater.
 4. Color and Sheen: Black, satin.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify that substrates are stable and capable of supporting the weight of signage units.
- B. Verify that substrates have been adequately prepared to securely anchor signage units.

3.02 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Protect surrounding finishes and fixtures from damage by work of this Section

3.03 INSTALLATION

- A. Locate signs and accessories where indicated, using mounting methods of types described and complying with manufacturer's written instructions and the approved shop drawings.
- B. Install signs level, plumb, and at heights indicated, with sign surfaces free of distortion and other defects in appearance.
- C. Bracket-Mounted Signs: Provide brackets, fittings, and hardware for mounting signs that project from walls and are suspended from ceilings. Attach brackets and fittings securely

to walls and ceilings with concealed fasteners and anchoring devices to comply with Contract Drawings and the approved shop drawings.

D. Connect exit signage lighting to emergency power circuit.

3.04 CLEANING AND PROTECTION

A. Clean exposed surfaces in accordance with manufacturer's instructions.

END OF SECTION 10 14 33

REGIONAL TRANSIT WAYFINDING STANDARD SPECIFICATIONS

10 14 65

REAL-TIME INFORMATION DISPLAY

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Real-Time Information Displays assemblies consist of a monitor; a controller (computer); and an enclosure. The work also includes electrical work and data wiring.

1.02 MEASUREMENT AND PAYMENT

- A. Separate measurement and payment will not be made for work required under this Section. All costs in connection with the work specified herein will be considered to be included with the related item of work in the Bid Schedule of the Bid Form, or incidental to the Work.

1.03 REFERENCES

- A. Regional Real-Time Signs Requirements and Specifications, included in the Appendices of the Metropolitan Transportation Commission (MTC) Regional Transit Wayfinding Guidelines and Standards, bound in the Contract Drawings. It shall be understood that the requirements listed under “Considerations” as optional shall be mandatory for the Work of this Contract. Referred to herein as the Regional Real-Time Specs.
- B. The applicable date of reference standards shall be understood to be the date of the Invitation to Bid.
- C. American Society for Testing and Materials (ASTM):
 - 1. ASTM B123 Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
 - 2. ASTM B153 Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
- D. National Fire Protection Association (NFPA):
 - 1. NFPA 70 National Electrical Code (NEC).
- E. Society For Protective Coatings (SSPC):

1. SSPC SP6/NACE No. 3 Commercial Blast Cleaning

1.04 SUBMITTALS

- A. General: Refer to Division 01 – General Requirements provisions regarding submittal procedures, shop drawings, product data and samples
- B. Product Data: For each type of product.
- C. Shop Drawings: Show fabrication and installation details including mounting devices.
 - 1. Show mounting heights, locations of supports, and accessories.
 - 2. Wiring Diagrams: Power, control, and data (communications) wiring.
- D. Manufacturer Information:
 - 1. Provide overview literature describing manufacturer's overall scope of products and manufacturing capabilities.
 - 2. Provide URL for manufacturer's web site; web site must provide access to technical data, images and general product information.
 - 3. Provide manufacturer's toll-free telephone number for product support.
 - 4. Provide complete list of materials proposed for use, including manufacturer's catalog number and description for each product in typewritten form. Obtain Engineer's approval of materials before proceeding with fabrication.
- E. Calculations: Submit structural calculations including wind and vibration loadings prepared by a professional Engineer registered in California with a record of successful experience providing engineering services for installations similar in design and scope to the work of this Section. Include structural calculations for anchorage.

1.05 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- B. Fabricator Qualifications
 - 1. Minimum 5 years' experience in the fabrication of monitors of similar size and capabilities.
 - 2. Upon Engineer's request, provide reference list and photos of at least 10 public or commercial projects currently using similar monitors made by the fabricator.

- C. Powder-Coating Applicator Qualifications: A firm experienced in successfully applying powder coatings of type indicated and employing competent control personnel to conduct continuing, effective quality-control program to ensure compliance with requirements.

1.06 DELIVERY, STORAGE AND HANDLING

- A. Deliver, store, and handle materials in accordance with the manufacturer’s instructions. Store in dry, secure location, protected against direct sunlight and excessive heat.

PART 2 - PRODUCTS

2.01 PRODUCTS

- A. General: In addition to the requirements specified herein, the assemblies shall be in accordance with the requirements specified in the Regional Real-Time Specs.
- B. Real-Time Information Display assemblies shall be able to receive and display hub specific real-time information regarding transit arrivals. Such information consists of a web page assigned to the specific hub and transmitted via the internet. Simply, the display is a large screen monitor connected to a controller that exhibits a specific web page.
- C. Controller: The controller shall be a personal computer (PC) which includes an internet connection and shall be able to launch and run a standard web browser such as Internet Explorer. Provide controller complete with standard web browser. In lieu of a separate PC, the controller may be integrated with the monitor as a single unit subject to the approval of the Engineer.
- D. Enclosure: Refer to the Contract-specific and Standard Drawings. The enclosure shall be selected for the specific locations in accordance with the requirements specified in the Regional Real-Time Specs. The screen and controller shall be contained in a single stainless steel housing and anti-glare reflective protection for the screen. Where screen is recessed in wall panel, controller may be in a separate housing providing the same rating as the screen. The housing shall meet the following minimum specifications:
 - 1. Integrated 120V power source for both screen and sign controller. If power source is not within 5 feet of the screen and sign controller, an in-line cut-off (disconnect) switch shall be furnished and installed.
 - 2. Stainless steel shall conform to material requirements specified in Section 05 70 00, Decorative Metal.
 - 3. The screen and sign controller enclosures shall be IP65-rated for exterior installations and IP 54-rated for interior installations except as otherwise approved by the Engineer.

4. Outdoor rated enclosures shall have Air Conditioning (AC) units to maintain proper operating temperature for the real-time display sign and controller, except as otherwise approved by the Engineer.

2.02 ENCLOSURE MOUNTING AND ACCESSORIES

- A. Brackets, Anchors, and Inserts: Fabricate from stainless steel to suit location and mounting conditions. Where exposed to view, stainless steel shall be Type 314 with brushed finish.

2.03 ELECTRICAL

- A. Contractor shall furnish and install conduit, wiring, and other electrical components as necessary to provide power and communications connections for complete and functioning real-time display system.
- B. Refer to Division 26, Electrical, for related requirements.

2.04 FABRICATION

- A. General: Provide assemblies of configurations indicated.
 1. Welded Connections: Comply with AWS standards for recommended practices in shop welding. Provide welds behind finished surfaces without distortion or discoloration of exposed side. Clean exposed welded surfaces of welding flux and dress exposed and contact surfaces.
 2. Mill joints to tight, hairline fit. Form joints exposed to exclude water penetration.
 3. Form joints to eliminate light leaks. Provide gasketing and seals as required to ensure weather-tight assembly.
 4. Conceal fasteners if possible; otherwise, locate fasteners where they will be inconspicuous.
- B. Shop assemble units and apply finishes and graphics in accordance with [the Contract Drawings](#), manufacturer's standards and approved shop drawings.

2.05 STEEL FINISHES

- A. Galvanizing: Hot-dip galvanize products made from rolled, pressed, and forged steel shapes, castings, plates, bars, and strips indicated to be galvanized to comply with ASTM A123.
 1. Hot-dip galvanize steel and iron hardware indicated to be galvanized to comply with ASTM A153.

2. Do not quench or apply post-galvanizing treatments that might interfere with paint adhesion.
- B. Powder-Coat Finish on Non-galvanized Ferrous Metal: Prepare, treat, and coat metal to comply with resin manufacturer's written instructions and as follows:
1. Prepare uncoated ferrous-metal surfaces to comply with SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
 2. Apply thermosetting polyester or acrylic urethane powder coating with cured-film thickness not less than 1.5 mils or resin manufacturer's recommended thickness, whichever is greater.
- C. Powder-Coat Finish on Galvanized Metal: Prepare, treat, and coat metal to comply with resin manufacturer's written instructions and as follows:
1. Prepare galvanized metal by thoroughly removing grease, dirt, oil, flux, and other foreign matter.
 2. Treat prepared metal with zinc-phosphate pretreatment, rinse, and seal surfaces.
 3. Apply thermosetting polyester or acrylic urethane powder coating with cured-film thickness not less than 1.5 mils or resin manufacturer's recommended thickness, whichever is greater.
- D. Color and Sheen: Select color to suit specific locations subject to the approval of the Engineer; typically, black. Sheen: satin.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify that substrates are stable and capable of supporting the weight of units.

3.02 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Protect surrounding finishes and fixtures from damage by work of this Section

3.03 INSTALLATION

- A. Locate components in accordance with approved plans and complying with manufacturer's written instructions, as applicable.
- B. Install monitors and enclosures level and plumb, with surfaces free of distortion and other defects in appearance.

- C. Attach brackets and fittings securely with concealed fasteners and anchoring devices in accordance with the approved shop drawings.
- D. Complete connections to internet. Demonstrate that each assembly including web browser is functioning and connected to the internet, and that all popups, screen savers and automated scripts have been disabled.-
- E. Verify that each assembly has been tested per the Real-Time Display Test Plan as outlined in the Regional Real-Time Specs.

3.04 CLEANING AND PROTECTION

- A. Clean exposed surfaces in accordance with manufacturer's instructions.

END OF SECTION 10 14 65

Appendix D:
REAL-TIME DISPLAYS





Real-Time Transit Information System

REGIONAL REAL-TIME SIGNS REQUIREMENTS AND SPECIFICATIONS

Version 4.1

Prepared for:

Metropolitan Transportation Commission



Prepared by:



August 26, 2010

REGIONAL REAL-TIME TRANSIT INFORMATION SYSTEM
REGIONAL SIGN REQUIREMENTS AND SPECIFICATIONS

DOCUMENT HISTORY

DOCUMENT DESCRIPTION	DATE	VERSION
First release of the Physical Requirements and Specifications	2/7/2007	1.0
Draft update to the Physical Requirements and Specifications	2/26/2010	2.0
Second draft update of the Physical Requirements and Specifications	4/1/2010	3.0
Third draft update of the Requirements and Specifications	5/4/2010	4.0
Second release of the Physical Requirements and Specifications	8/26/2010	4.1

REGIONAL REAL-TIME TRANSIT INFORMATION SYSTEM

REGIONAL SIGN REQUIREMENTS AND SPECIFICATIONS

1. INTRODUCTION

As part of the Regional Real-Time Transit Information System, transit agencies will be sending MTC/511 transit arrival/departure predictions for this information to be made available on the phone and the 511 website. In addition, MTC will disseminate predictions to a network of regional signs located at transit hubs. The transit hub signs will display the predictions for all applicable agencies and routes that service the specific transit hub.

MTC would like to manage the content and format of the messages displayed on the regional signs so that they provide useful and consistent information to Bay Area transit users. As such, MTC, with input from the transit agencies, is developing a set of principles to ensure that the signs display the proper information in the agreed upon format.

2. PROPOSED SYSTEM

Due to the complex nature of trying to maintain consistency of content and format, and the importance to keep costs to the agencies low, it is important to design the system in such a way to best accomplish both goals.

The solution is to send the prediction data to a web server located at the 511 Traveler Information Center (TIC). This web server will be configured such that it will contain separate web pages for each transit hub slated to have signs. At each hub, the regional signs or monitors will be able to display the contents of the web page assigned for that specific hub. The web server will be configurable to allow the maximum control over the content and format of the messages. Some of the configurations will include, but not be limited to:

- For each hub: Agency, route and direction to be displayed on each line, and the display order of the routes.
- For the overall system: font, number of predictions per line, colors, display time for each page when alternating pages are used, how far into the future must departure times be for display, timeout values, and error messages.

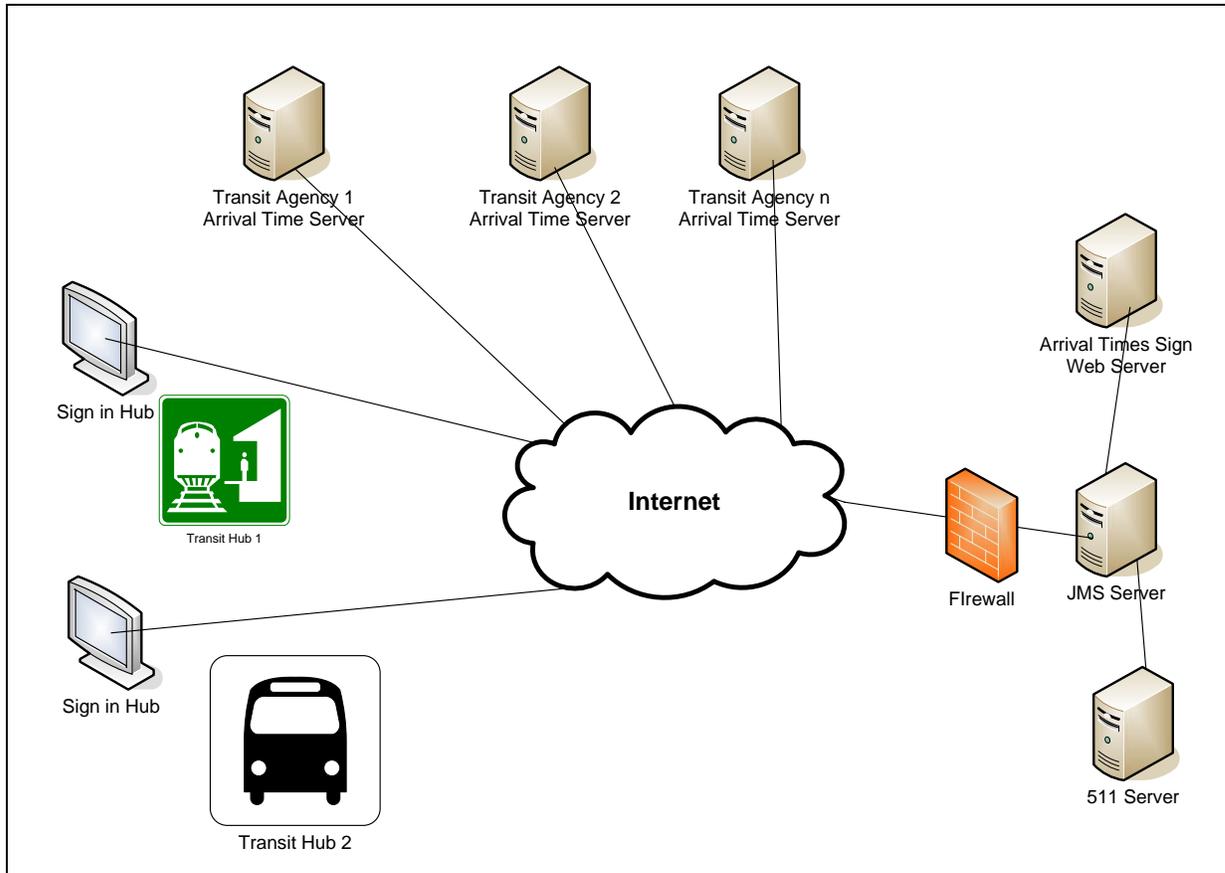
Some of the benefits of this solution include:

- Reduction of latency: Since there will be no additional communications of data to the hubs, data on the signs will be updated as often as the web pages are refreshed.
- More availability to the public: If desired, the web pages could be made available to the public for display on home computers or PDAs.

The following figure illustrates a high level concept of the proposed regional sign system.

REGIONAL REAL-TIME TRANSIT INFORMATION SYSTEM

REGIONAL SIGN REQUIREMENTS AND SPECIFICATIONS



In order to maintain a sense of consistency of the regional signs under the Regional Real-Time Transit Information System, the following sections are minimum requirements and specifications for the signs and the sign controller. In essence, the signs are simply large screen monitors connected to, or integrated with, a computer that displays a specific web page.

3. SIGN REQUIREMENTS AND SPECIFICATIONS

The following are the mandatory specifications for the regional real-time signs.

1. The regional sign shall have the ability to display the specific contents of a web page generated by a website for real-time transit information.
2. Scrolling signs shall not be permitted, but page alternation will be permitted. The display time for each page when pages are alternated will be subject to a pre-defined timer.
3. The regional real-time display/monitor shall meet the following minimum specifications:
 - Minimum size: 45" diagonal (active display area)
 - Viewing Angles (Horizontal/Vertical): 178 degrees/178 degrees
 - Minimum colors: 16 million
 - Minimum resolution: 1024x768
 - Contrast Ratio: 800:1
 - Brightness Levels: Indoor installations = 450 cd/m² (candelas per square meter)
Outdoor installations = 600 cd/m²

REGIONAL REAL-TIME TRANSIT INFORMATION SYSTEM

REGIONAL SIGN REQUIREMENTS AND SPECIFICATIONS

4. The controller (PC) for the regional real-time display/monitor shall include an Internet connection and shall be able to launch and run a standard web browser (i.e., Internet Explorer).
5. The regional real-time signs shall be in operation for not less than five years.
 Note: Should any regional real-time sign fail, malfunction or cease to display real-time transit information prior to a five-year operating life, the agency shall be responsible for the repair or replacement of the real-time sign. Regional real-time signs that have been in operation for five or more years will be replaced by MTC.

4. CONSIDERATIONS

The following are specification items that should be considered based on the specific situations at each hub and the locations for the regional signs. These considerations are optional. If an agency decides to not take into account these considerations, the agency is still required to ensure that its signs meet the mandatory requirements listed in section 3 of this document.

4.1 Sealed Enclosures

Depending on the specific location and environmental conditions of the area where the real-time displays will be installed, there will be different recommendations for providing a sealed enclosure to protect the real-time display. The following scenarios describe the various conditions in which the real-time displays could be installed. Included with the descriptions are the sealed enclosure recommendations for the real-time displays under each scenario. Each IP-rated enclosure is sealed and includes a built-in cooling unit. Sections 4.1.1 and 4.1.2 describe the enclosure types in greater detail.

Table 1: Installation Scenarios for Real-Time Displays			
Scenario	Type	Description	Recommended Enclosure
A	Outdoors	The real-time display is installed within an area subject to direct exposure to sunlight and the outside elements including rain, wind, dust, moisture. Temperature conditions can reach in excess of 100 degrees Fahrenheit (38 degrees Celsius).	IP 65
B	Outdoors	The real-time display is installed within a non-sealed (i.e., not IP rated) cabinet, where the cabinet is subject to direct sunlight and exposure to the elements including rain, wind, dust, moisture. Temperature conditions can reach in excess of 100 degrees Fahrenheit.	IP 54
C	Outdoors	The real-time display is installed within a small covered area that is subject to indirect or direct sunlight and exposure to the elements including rain, wind, dust, and	IP 65

REGIONAL REAL-TIME TRANSIT INFORMATION SYSTEM
REGIONAL SIGN REQUIREMENTS AND SPECIFICATIONS

Table 1: Installation Scenarios for Real-Time Displays			
Scenario	Type	Description	Recommended Enclosure
		moisture. Temperature conditions can reach in excess of 100 degrees Fahrenheit. An example is a small covered area such as underneath an awning where the display will be exposed to outside environment elements.	
D	Indoors	The real-time display is installed within an indoor environment that is subject to indirect sunlight and exposure to the elements including wind, dust, and moisture, but not rain. Temperature conditions can reach up to 100 degrees Fahrenheit. An example is an area that is covered on most sides, but does not have doors. Thus, this indoor area will not have temperature controls and will be subject to some of the outside environment elements.	IP 54
E	Indoors	The real-time display is installed within a non-sealed (i.e., not IP rated) cabinet in an indoor area, where the cabinet is subject to wind, dust, moisture, and indirect sunlight, but not rain. Temperature conditions can reach up to 100 degrees Fahrenheit. An example is an area that is covered on most sides, but does not have doors. Thus, this indoor area will not have temperature controls and will be subject to some of the outside environment elements.	IP 54
F	Indoors	The real-time display is installed within a controlled environment that experiences low moisture, low wind, and no direct or indirect sunlight. Temperatures are controlled and can reach no higher than 80 degrees Fahrenheit (27 degrees Celsius).	None

The IP ratings are intended to protect the highly sensitive electronics of the display and the display controller (i.e., PC) from the elements. The following are the requirements for the IP ratings of the display enclosure.

4.1.1 Enclosures with an IP65 Rating

This is the highest form of protection for the real-time displays. The enclosure provides the only form of protection for the display monitor, embedded PC and any peripheral equipment.

REGIONAL REAL-TIME TRANSIT INFORMATION SYSTEM

REGIONAL SIGN REQUIREMENTS AND SPECIFICATIONS

And, as the enclosure includes a cooling unit, it also provides the only form of climate control for the displays, which may generate and be exposed to high levels of heat.

The real-time displays should be installed in an IP65 rated enclosure when the display assembly (display and enclosure) is installed in an outside environment subjected to all of the elements in particular rain, dust and moisture. Outside environments include sidewalk and planter areas, medians, uncovered parking lots, uncovered pier areas, bus shelters, transit center bus platforms (covered or uncovered), and any situation where the enclosure is in a outdoor environment as described in Section 4.1.

4.1.2 Enclosures with an IP 54 Rating

This is the second highest form of protection for the real-time displays. The enclosure provides protection from moisture and some protection from dust, wind, and little protection from rain. Dust may enter the enclosure in dusty and windy environments, and water will get through during washdown of water (i.e., rain). The enclosure also includes a cooling unit.

The real-time displays should be installed in an IP54 rated enclosure when the display assembly (display and enclosure) is installed in an outside environment but has some form of additional protection from the outdoor elements. The additional protection items could include a non-sealed enclosure such as a Transit Information Display case, a covered walkway area that has walls covering most sides but does not have doors (e.g., pedestrian underground walkway areas, unpaid areas of BART).

4.2 Anti-Glare

Anti-glare screen elements should be provided for those hubs that will have regional signs subject to indirect lighting or sunlight where the glare will have visual impacts to reading the display contents.

4.3 Wireless Connectivity

Each real-time display should be capable of wireless connectivity (802.11) where applicable. This is essential for those hubs that do not have a wired network environment and thus the most practical means of a networked connection is using wireless connectivity.

4.4 Sign Controller

The real-time displays in a specific hub can be networked together and utilize a single Internet connection. It is preferable to have all of the regional real-time displays within a hub to be networked together in order to have a single point of communications to the 511 system to reduce communications costs.

Other considerations for the sign controller include the following minimum specifications:

- Memory: 1GB RAM
- CPU: 1.5GHz Pentium or similar
- Ethernet: 10/100 network interface card (RJ-45)
- Connectors: EIA-232 (2 ports), USB (2 ports)
- Keyboard/mouse: USB
- Hardware Drive: 5 GB
- Operating temperature: -10 to +50 degrees Celsius (+14 to +122 degrees Fahrenheit)
- Humidity Operation: 5–90% non condensing
- Hardware Drive: 20GB

REGIONAL REAL-TIME TRANSIT INFORMATION SYSTEM

REGIONAL SIGN REQUIREMENTS AND SPECIFICATIONS

- Combination CD RW/DVD ROM drive

The sign controller should include a standard port to connect to a display monitor such as an HD15 port. Other ports that could be included are DVI, composite and SD video ports.

4.5 Sign Controller and Monitor Distance

The cable that connects the monitor with the sign controller should be a high bandwidth, shielded cable capable of carrying the video signals for the pixel resolution (e.g., VGA, Wide XGA) of the proposed display/monitor.

It is preferred that the distance between the monitor and the sign controller be 10 feet or less. This distance takes into account all of the cable routing distance including twists and bends which may yield and final video cable length can be up to 15 feet or even slightly more. Specialized video cables can be used for longer cable lengths. However using longer specialized video cables will require signal converters at each end of the cable.

5. REVIEW/APPROVALS PROCESS

The agencies shall submit their plans and/or details of the regional real-time signs to MTC for review and approval. MTC shall sign off of on the agency's compliance with the mandatory requirements and specifications listed in Section 3. This review is strictly for compliance with the mandatory elements.

MTC will also review for the consideration elements and provide input to the agencies. This input is intended to provide guidance on potential considerations that could increase the operating life of the real-time signs proposed by the agencies.



Real-Time Transit Information System

REGIONAL REAL-TIME SIGNS REQUIREMENTS AND SPECIFICATIONS

Version 4.3

Prepared for:

Metropolitan Transportation Commission



Prepared by:



January 11, 2012

REGIONAL REAL-TIME TRANSIT INFORMATION SYSTEM
REGIONAL SIGN REQUIREMENTS AND SPECIFICATIONS

DOCUMENT HISTORY

DOCUMENT DESCRIPTION	DATE	VERSION
First release of the Physical Requirements and Specifications	2/7/2007	1.0
Draft update to the Physical Requirements and Specifications	2/26/2010	2.0
Second draft update of the Physical Requirements and Specifications	4/1/2010	3.0
Third draft update of the Requirements and Specifications	5/4/2010	4.0
Second release of the Physical Requirements and Specifications	8/26/2010	4.1
Fourth draft update of the Requirements and Specifications	8/4/2011	4.2
Fifth update to the Requirements and Specifications – added bandwidth and testing guidelines	1/11/2012	4.3

REGIONAL REAL-TIME TRANSIT INFORMATION SYSTEM

REGIONAL SIGN REQUIREMENTS AND SPECIFICATIONS

1. INTRODUCTION

As part of the Regional Real-Time Transit Information System, transit agencies will be sending MTC/511 transit arrival/departure predictions for this information to be made available on the phone and the 511 website. In addition, MTC will disseminate predictions to a network of regional signs located at transit hubs. The transit hub signs will display the predictions for all applicable agencies and routes that service the specific transit hub.

MTC would like to manage the content and format of the messages displayed on the regional signs so that they provide useful and consistent information to Bay Area transit users. As such, MTC, with input from the transit agencies, developed a set of principles to ensure that the signs display the proper information in the agreed upon format.

2. PROPOSED SYSTEM

Due to the complex nature of trying to maintain consistency of content and format, and the importance to keep costs to the agencies low, it is important to design the system in such a way to best accomplish both goals.

The solution is to send the prediction data to a web server located at the 511 Traveler Information Center (TIC). This web server will be configured such that it will contain separate web pages for each transit hub slated to have signs. At each hub, the regional signs or monitors will be able to display the contents of the web page assigned for that specific hub. The web server will be configurable to allow the maximum control over the content and format of the messages. Some of the configurations will include, but not be limited to:

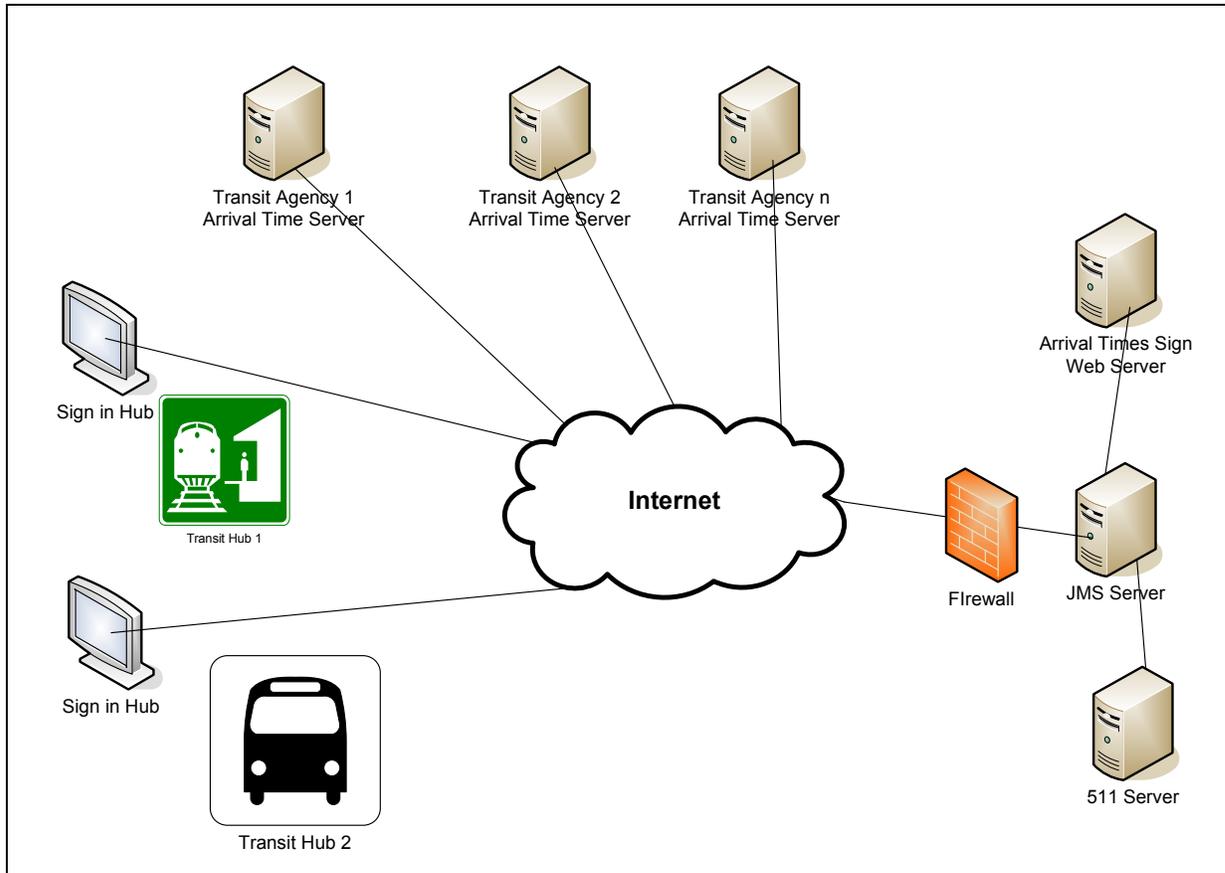
- For each hub: Agency, route and direction to be displayed on each line, and the display order of the routes.
- For the overall system: font, number of predictions per line, colors, display time for each page when alternating pages are used, how far into the future must departure times be for display, timeout values, and error messages.

Some of the benefits of this solution include:

- Reduction of latency: Since there will be no additional communications of data to the hubs, data on the signs will be updated as often as the web pages are refreshed.
- More availability to the public: If desired, the web pages could be made available to the public for display on home computers or PDAs.

The following figure illustrates a high level concept of the proposed regional sign system.

REGIONAL REAL-TIME TRANSIT INFORMATION SYSTEM REGIONAL SIGN REQUIREMENTS AND SPECIFICATIONS



In order to maintain a sense of consistency of the regional signs under the Regional Real-Time Transit Information System, the following sections are minimum requirements and specifications for the signs and the sign controller. In essence, the signs are simply large screen monitors connected to, or integrated with, a computer that displays a specific web page.

3. SIGN REQUIREMENTS AND SPECIFICATIONS

The following are the mandatory requirements for the regional real-time signs.

1. The regional sign shall have the ability to display the specific contents of a web page generated by a website for real-time transit information.
2. The regional sign shall not be interrupted by any pop-up windows/alerts/messages that automatically appear in front of sign data and interfere with the dissemination of real-time transit information. Specifically, the system with which the sign is connected shall be configured to prevent all pop-up boxes/messages/alerts from automatic software update checks or other software configuration for alerts and messages. Items that normally conduct automatic update checks include, but are not limited to, the following:
 - Windows (the system itself),
 - Web browsers (IE, Firefox, etc.)
 - Installed third party software (Adobe, antivirus applications, etc.)

REGIONAL REAL-TIME TRANSIT INFORMATION SYSTEM

REGIONAL SIGN REQUIREMENTS AND SPECIFICATIONS

3. The regional sign shall not be interrupted by screen savers or popups of any kind that automatically appear in front of sign data and interfere with the dissemination of real-time transit information. Specifically, the system with which the sign is connected shall be configured to prevent screen savers and popups of any kind from appearing at any time.
4. The regional sign shall be displayed in full screen format, without the appearance of browser headers and operating system navigation and status bars. The sign display shall be the only item to appear on the screen at all times.
5. Scrolling-page signs shall not be permitted, but page alternation will be permitted. The display time for each page when pages are alternated will be subject to a pre-defined timer.
6. The regional real-time display/monitor shall meet the following minimum specifications:
 - Minimum size: 45" diagonal (active display area)
 - Viewing Angles (Horizontal/Vertical): 178 degrees/178 degrees
 - Minimum colors: 16 million
 - Minimum resolution: 1920x1080
 - Contrast Ratio: 2000:1
 - Brightness Levels: Indoor installations = 450 cd/m² (candelas per square meter)
Outdoor installations = 600 cd/m²
7. The controller (PC) for the regional real-time display/monitor shall include an Internet connection and shall be able to launch and run a standard web browser (i.e., Internet Explorer). There shall be no other use of the PC other than the Internet Connection and display of the real-time transit sign information.
8. The Internet connection for the Real-time Display (RTD) units shall provide at least 384 kilobits per second (Kbps) of bandwidth. There shall be one or two RTD units per one Internet connection. There shall not be more than two RTD units per one Internet connection.
9. The regional real-time signs shall be in operation for not less than five years.
Note: Should any regional real-time sign fail, malfunction or cease to display real-time transit information prior to a five-year operating life, the agency shall be responsible for the repair or replacement of the real-time sign. Regional real-time signs that have been in operation for five or more years will be replaced by MTC.

4. CONSIDERATIONS

The following are specification items that should be considered based on the specific situations at each hub and the locations for the regional signs. These considerations are optional. If an agency decides to not take into account these considerations, the agency is still required to ensure that its signs meet the mandatory requirements listed in section 3 of this document.

4.1 Sealed Enclosures

Depending on the specific location and environmental conditions of the area where the real-time displays will be installed, there will be different recommendations for providing a sealed enclosure to protect the real-time display. The following scenarios describe the various conditions in which the real-time displays could be installed. Included with the descriptions are the sealed enclosure recommendations for the real-time displays under each scenario.

**REGIONAL REAL-TIME TRANSIT INFORMATION SYSTEM
REGIONAL SIGN REQUIREMENTS AND SPECIFICATIONS**

Each IP-rated enclosure is sealed and includes a built-in cooling unit. Sections 4.1.1 and 4.1.2 describe the enclosure types in greater detail.

Table 1: Installation Scenarios for Real-Time Displays			
Scenario	Type	Description	Recommended Enclosure
A	Outdoors	The real-time display is installed within an area subject to direct exposure to sunlight and the outside elements including rain, wind, dust, moisture. Temperature conditions can reach in excess of 100 degrees Fahrenheit (38 degrees Celsius).	IP 65
B	Outdoors	The real-time display is installed within a non-sealed (i.e., not IP rated) cabinet, where the cabinet is subject to direct sunlight and exposure to the elements including rain, wind, dust, moisture. Temperature conditions can reach in excess of 100 degrees Fahrenheit.	IP 54
C	Outdoors	The real-time display is installed within a small covered area that is subject to indirect or direct sunlight and exposure to the elements including rain, wind, dust, and moisture. Temperature conditions can reach in excess of 100 degrees Fahrenheit. An example is a small covered area such as underneath an awning where the display will be exposed to outside environment elements.	IP 65
D	Indoors	The real-time display is installed within an indoor environment that is subject to indirect sunlight and exposure to the elements including wind, dust, and moisture, but not rain. Temperature conditions can reach up to 100 degrees Fahrenheit. An example is an area that is covered on most sides, but does not have doors. Thus, this indoor area will not have temperature controls and will be subject to some of the outside environment elements.	IP 54
E	Indoors	The real-time display is installed within a non-sealed (i.e., not IP rated) cabinet in an indoor area, where the cabinet is subject to wind, dust, moisture, and indirect sunlight,	IP 54

REGIONAL REAL-TIME TRANSIT INFORMATION SYSTEM
REGIONAL SIGN REQUIREMENTS AND SPECIFICATIONS

Table 1: Installation Scenarios for Real-Time Displays			
Scenario	Type	Description	Recommended Enclosure
		but not rain. Temperature conditions can reach up to 100 degrees Fahrenheit. An example is an area that is covered on most sides, but does not have doors. Thus, this indoor area will not have temperature controls and will be subject to some of the outside environment elements.	
F	Indoors	The real-time display is installed within a controlled environment that experiences low moisture, low wind, and no direct or indirect sunlight. Temperatures are controlled and can reach no higher than 80 degrees Fahrenheit (27 degrees Celsius).	None

The IP ratings are intended to protect the highly sensitive electronics of the display and the display controller (i.e., PC) from the elements. The following are the requirements for the IP ratings of the display enclosure.

4.1.1 Enclosures with an IP65 Rating

This is the highest form of protection for the real-time displays. The enclosure provides the only form of protection for the display monitor, embedded PC and any peripheral equipment. And, as the enclosure includes a cooling unit, it also provides the only form of climate control for the displays, which may generate and be exposed to high levels of heat.

The real-time displays should be installed in an IP65 rated enclosure when the display assembly (display and enclosure) is installed in an outside environment subjected to all of the elements in particular rain, dust and moisture. Outside environments include sidewalk and planter areas, medians, uncovered parking lots, uncovered pier areas, bus shelters, transit center bus platforms (covered or uncovered), and any situation where the enclosure is in a outdoor environment as described in Section 4.1.

4.1.2 Enclosures with an IP 54 Rating

This is the second highest form of protection for the real-time displays. The enclosure provides protection from moisture and some protection from dust, wind, and little protection from rain. Dust may enter the enclosure in dusty and windy environments, and water will get through during washdown of water (i.e., rain). The enclosure also includes a cooling unit.

The real-time displays should be installed in an IP54 rated enclosure when the display assembly (display and enclosure) is installed in an outside environment but has some form of additional protection from the outdoor elements. The additional protection items could include a non-sealed enclosure such as a Transit Information Display case, a covered walkway area that has walls covering most sides but does not have doors (e.g., pedestrian underground walkway areas, unpaid areas of BART).

4.2 Anti-Glare

REGIONAL REAL-TIME TRANSIT INFORMATION SYSTEM

REGIONAL SIGN REQUIREMENTS AND SPECIFICATIONS

Anti-glare screen elements should be provided for those hubs that will have regional signs subject to indirect lighting or sunlight where the glare will have visual impacts to reading the display contents.

4.3 Wireless Connectivity

Each real-time display should be capable of wireless connectivity (802.11) where applicable. This is essential for those hubs that do not have a wired network environment and thus the most practical means of a networked connection is using wireless connectivity.

4.4 Sign Controller

The real-time displays in a specific hub can be networked together and utilize a single Internet connection. It is preferable to have all of the regional real-time displays within a hub to be networked together in order to have a single point of communications to the 511 system to reduce communications costs.

Other considerations for the sign controller include the following minimum specifications:

- CPU: 2.5GHz dual core or similar
- Memory: 4GB RAM
- Ethernet: 10/100 network interface card (RJ-45)
- Connectors: EIA-232 (2 ports), USB (2 ports)
- Keyboard/mouse: USB
- Operating temperature: -10 to +50 degrees Celsius (+14 to +122 degrees Fahrenheit)
- Humidity Operation: 5~90% non condensing
- Hardware Drive: 50GB
- Combination CD RW/DVD ROM drive

The sign controller should include a standard port to connect to a display monitor such as an HD15 port. Other ports that could be included are DVI, composite and SD video ports.

4.5 Sign Controller and Monitor Distance

The cable that connects the monitor with the sign controller should be a high bandwidth, shielded cable capable of carrying the video signals for the pixel resolution (e.g., VGA, Wide XGA) of the proposed display/monitor.

It is preferred that the distance between the monitor and the sign controller be 10 feet or less. This distance takes into account all of the cable routing distance including twists and bends which may yield and final video cable length can be up to 15 feet or even slightly more. Specialized video cables can be used for longer cable lengths. However using longer specialized video cables will require signal converters at each end of the cable.

5. REVIEW/APPROVAL PROCESS

There are two MTC reviews to be performed and approved by MTC's Hub Signage Program Manager. The first review is of an agency's plans and/or details for its regional real-time signs. The review shall take place before an agency purchases any sign-related hardware.

Submitted details shall list the proposed sign's specifications and explain plans for how sign will comply with all other, non-specification-based requirements.

REGIONAL REAL-TIME TRANSIT INFORMATION SYSTEM REGIONAL SIGN REQUIREMENTS AND SPECIFICATIONS

MTC shall sign off on the agency's compliance with the mandatory requirements and specifications listed in Section 3. This review is strictly for compliance with the mandatory elements.

MTC will also review for the "consideration" elements and provide input to the agencies. This input is intended to provide guidance on potential considerations that could increase the operating life of the real-time signs proposed by the agencies.

The second MTC review and approval shall be of an agency's test results from the test plan found in Appendix A. Passing the test plan will ensure an agency's compliance with Section 3's requirements. The testing will occur after the installation of an agency's RTDs. Agencies shall submit testing results to MTC's Hub Signage Program Manager.

REGIONAL REAL-TIME TRANSIT INFORMATION SYSTEM

REGIONAL SIGN REQUIREMENTS AND SPECIFICATIONS

Appendix A – Real-time Display Test Plan

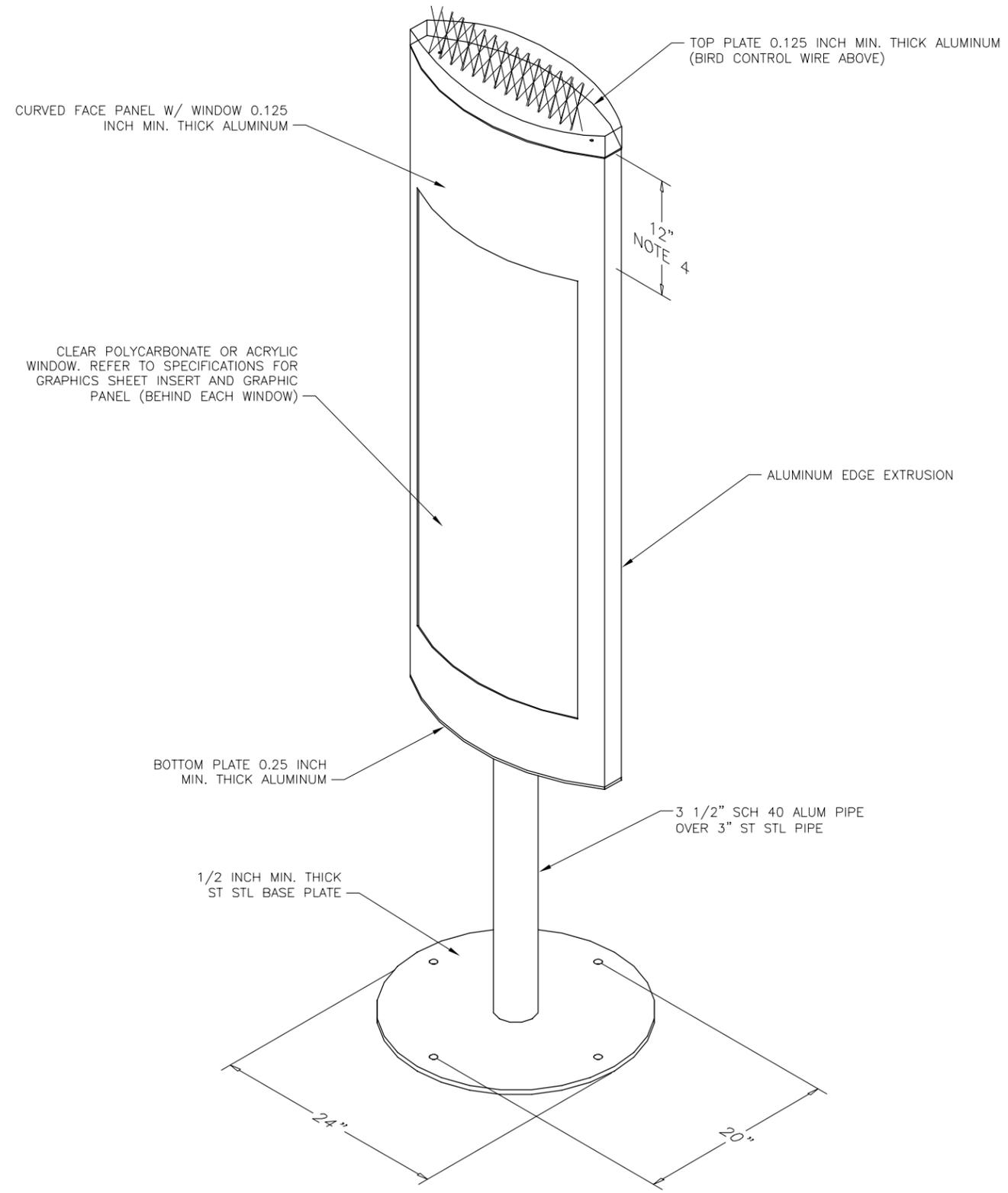
Upon installation of the RTD unit(s), testing shall commence to verify their proper operation. The test process shall be in accordance with the following test plan. The plan is intended to be the minimum necessary to verify proper operations of the RTD units. Transit agencies are encouraged to expand upon the steps to further test the performance and operation of the RTD units.

- a) Verify that all popups, screen savers and any other automated scripts are turned off.
- b) Launch the internet browser on each unit and enter the URL provided by 511 for use with the specific sign being tested.
- c) Confirm that the RTD unit is displaying the correct webpage for the specific hub site.
- d) Operate the RTD unit and display the contents of the 511-provided webpage continuously for a period of not less than seven (7) consecutive calendar days.
- e) Verify that, over the course of the seven consecutive calendar days, the RTD unit has not stopped displaying the 511-provided webpage and has not been interrupted by any pop-ups or screen savers. If the display has stopped or if pop-ups and/or screen savers have launched, address the issue and repeat steps A through E until the unit successfully displays the 511-provided page, without interruption, for seven consecutive days.
- f) Confirm that no more than two (2) RTD units are connected to one Internet connection.
- g) Verify that the available Internet bandwidth for each Internet Connection meets or exceeds the 384 Kbps minimum when up to two (2) RTD units are using the same Internet connection.
- h) Verify that the operating temperature within the IP-rated case meets the display manufacturer's acceptable operating temperature limits regardless of the outside ambient temperature during the seven day test period.
- i) Verify that the inside of the RTD enclosure is not accumulating dust or moisture during the seven day test period.

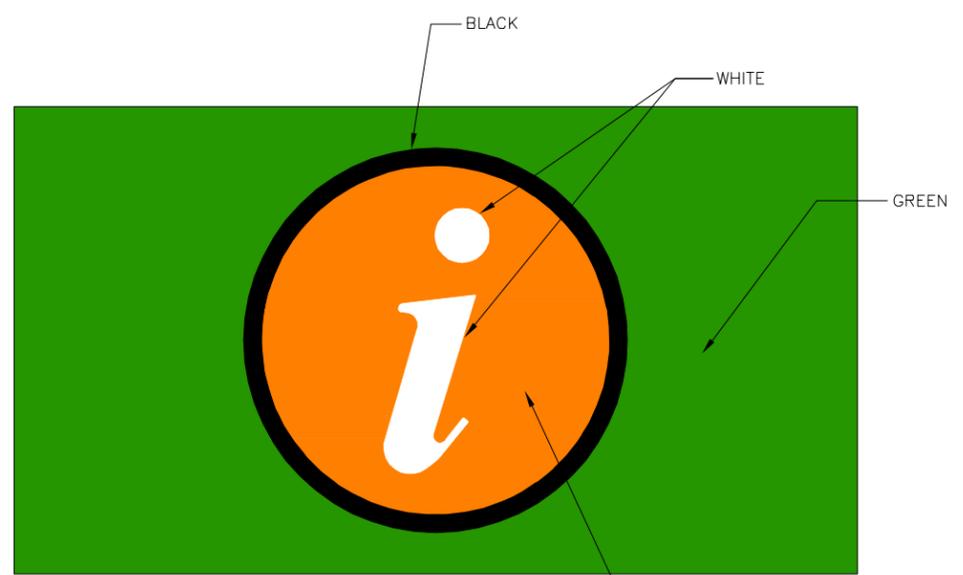
Appendix E:

STANDARD DRAWINGS

1. General
2. Wayfinding Kiosk
3. Directional Signage - Transit Connection and Information
4. Information Signage - Transit Information Display Real-time Display



TYPICAL KIOSK (POST AND PANEL WAYFINDING UNIT)
ISOMETRIC VIEW

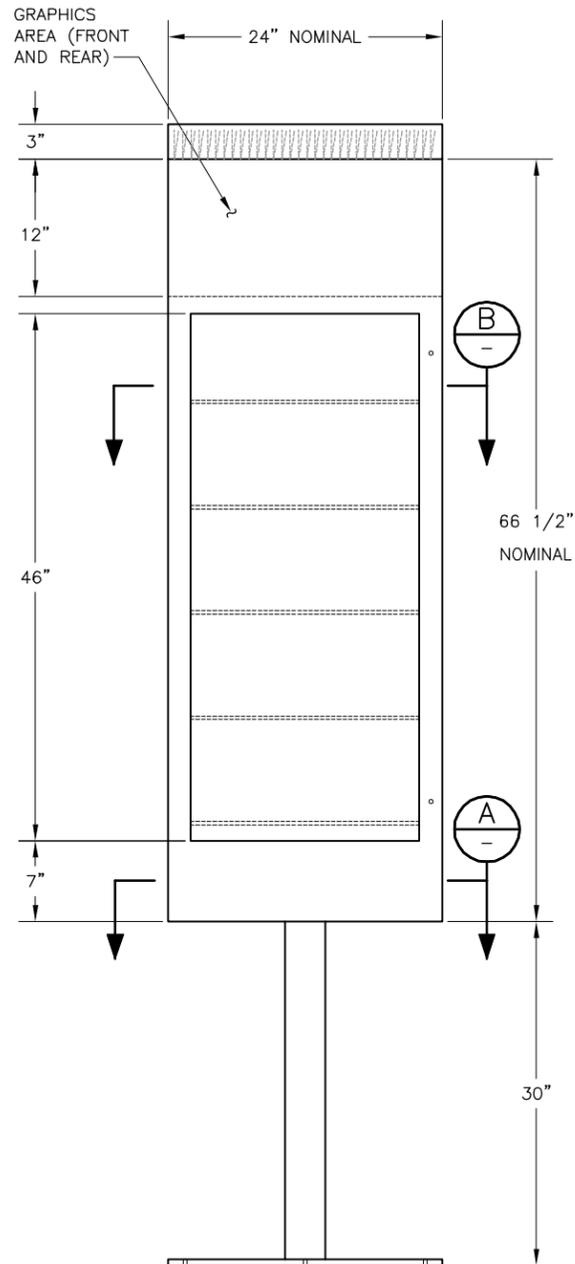


OBTAIN ELECTRONIC FILE OF ARTWORK FROM THE ENGINEER

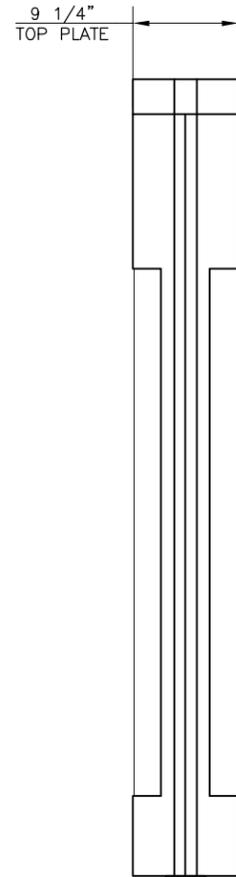
GRAPHIC AREA AT TOP OF CURVED FACE PANELS
SCALE: NTS

- NOTES:**
1. UNIT IS DOUBLE SIDED.
 2. TYPICAL MATERIALS: ALUMINUM EXTRUSION/PLATE/PIPE.
 3. FINISH: ENTIRE UNIT POWDER COAT ANODIZED SILVER. MASK TOP FOR PAINTING GREEN COLOR (SEE SPECIFICATIONS FOR PANTONE INFO).
 4. GRAPHIC AREA AT TOP, INCLUDING GREEN FIELD, SHALL BE PAINTED WITH MATTHEWS ACRYLIC PAINT. SEE SPECIFICATIONS FOR PANTONE INFO (ORANGE, GREEN, BLACK, AND WHITE).
 5. PROVIDE INSTALLATION MATERIALS SUCH AS ANCHOR BOLTS AND GROUT (NOT SHOWN).

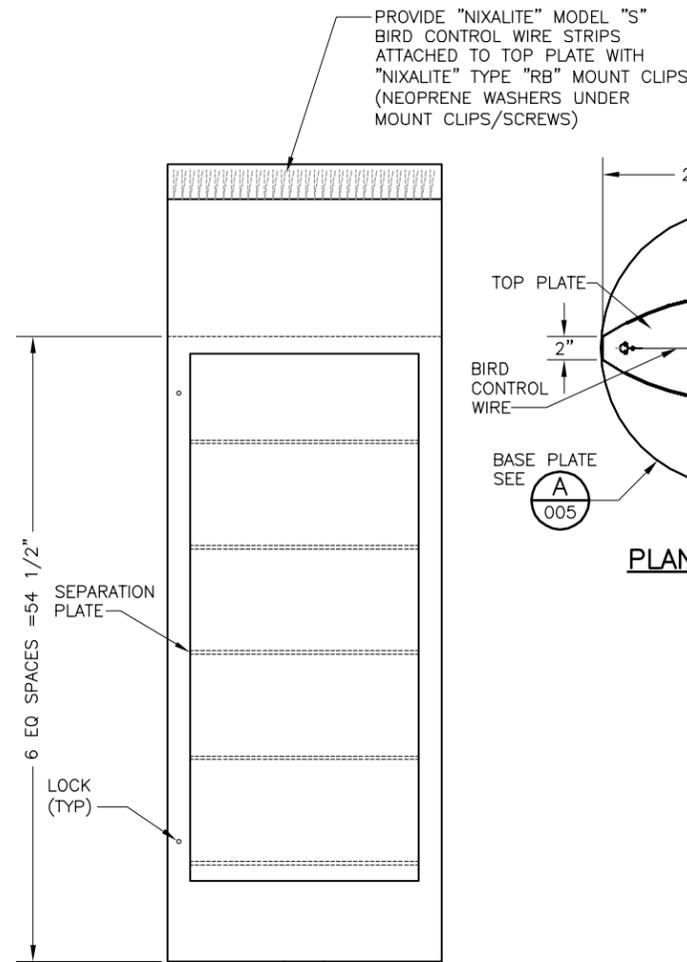
					DESIGNED:	REGIONAL TRANSIT WAYFINDING GUIDELINES & STANDARDS		STANDARD DRAWINGS		CADD FILENAME	
					DRAWN:					SIZE: SCALE	
					CHECKED:	 METROPOLITAN TRANSPORTATION COMMISSION		TYPICAL KIOSK POST AND PANEL WAYFINDING UNIT ISOMETRIC VIEW		CONTRACT NO.	REV.
					APPROVED:					CONTRACT SHEET NO.	PAGE NO.
REV.	DATE	BY	SUB	APP.	DESCRIPTION	DATE:					003
RELEASE 1.0d MARCH 2012					MARCH 2012						



FRONT VIEW



RIGHT VIEW

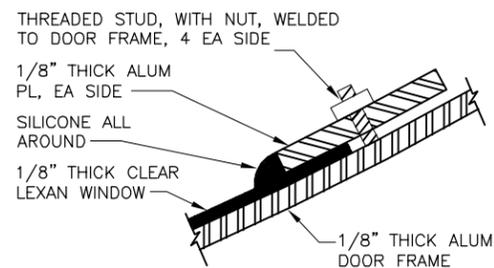


REAR VIEW

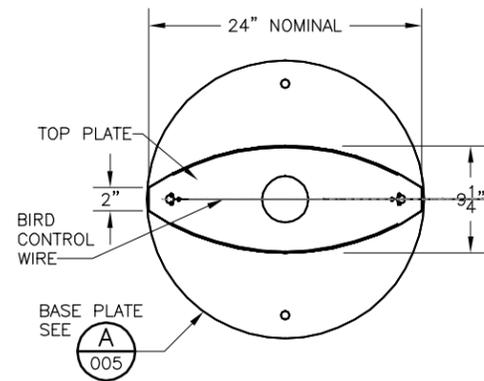
#10-24x³/₈ SET SCREW (X3) @ 120"

3 1/2" SCH 40 ALUM PIPE, SECURE TO KIOSK STRUCTURE, SLIP OVER AND SECURE TO 3" ST STL PIPE

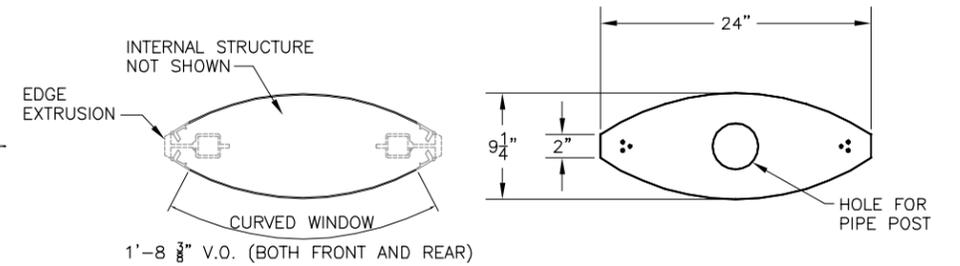
3" ST STL PIPE WELDED TO 1/2" THK ST STL BASE PLATE



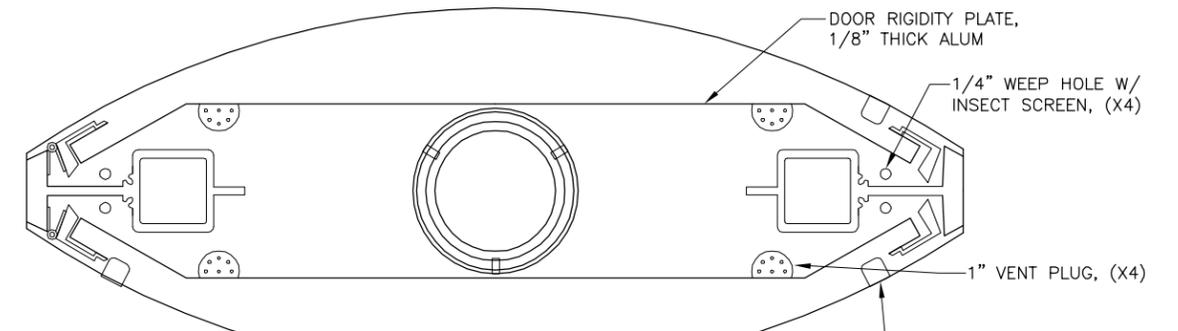
DETAIL 1



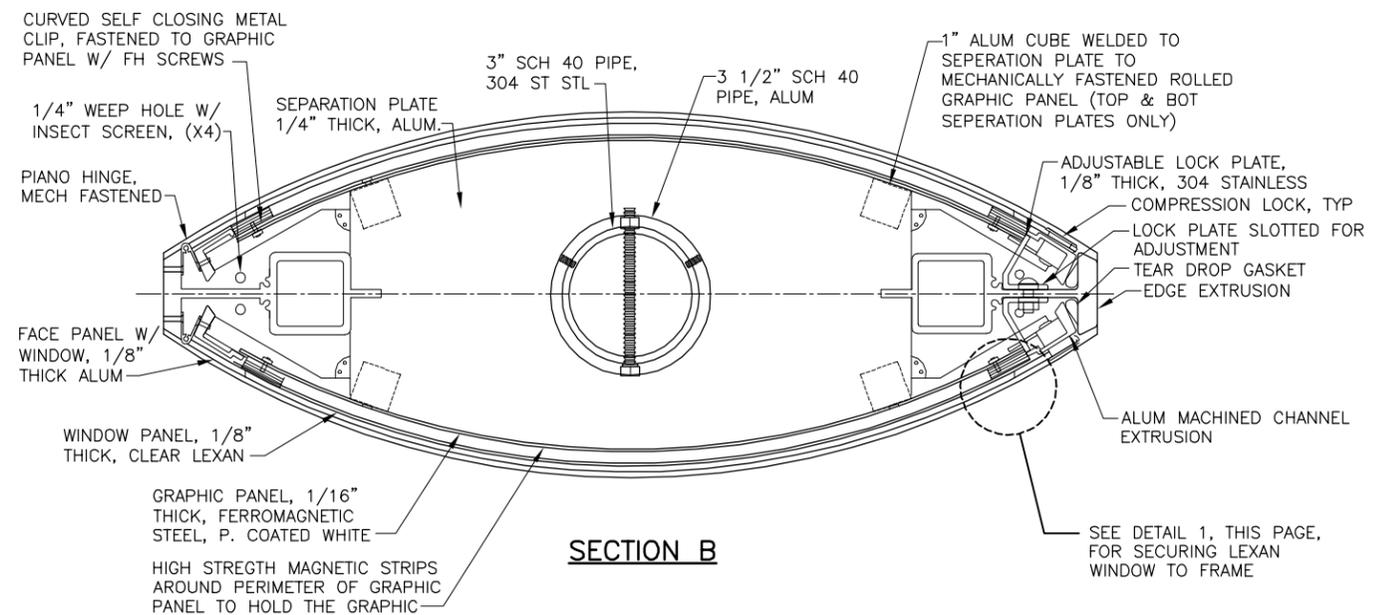
PLAN VIEW



NOTE: FULL HEIGHT FRONT AND REAR FACE PANELS SHALL BE HINGED AND OPEN FOR ACCESS TO INTERIOR.



SECTION A



SECTION B

NOTES REGARDING KIOSK DRAWINGS:

1. IT SHALL BE UNDERSTOOD THAT KIOSK DRAWINGS SHOW DESIGN INTENT AND NOT DETAILS READY FOR FABRICATION. CONTRACTOR SHALL DEVELOP DETAILED SHOP DRAWINGS AS SPECIFIED.
2. MANUFACTURER NAMES AND PART NUMBERS INFORMATION SHALL BE UNDERSTOOD TO BE FOLLOWED BY "OR EQUAL AS SELECTED TO SUIT CONTRACTOR'S DESIGN".
3. DIMENSIONS ARE INCLUDED TO SHOW DESIGN INTENT.

REGIONAL TRANSIT WAYFINDING GUIDELINES & STANDARDS

STANDARD DRAWINGS



METROPOLITAN
TRANSPORTATION
COMMISSION

TYPICAL KIOSK
POST AND PANEL WAYFINDING UNIT
ELEVATIONS AND DETAILS

CADD FILENAME

SIZE: SCALE

CONTRACT NO. REV.

CONTRACT SHEET NO. PAGE NO.

004

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DATE:
MARCH 2012

REV. DATE BY SUB APP. DESCRIPTION

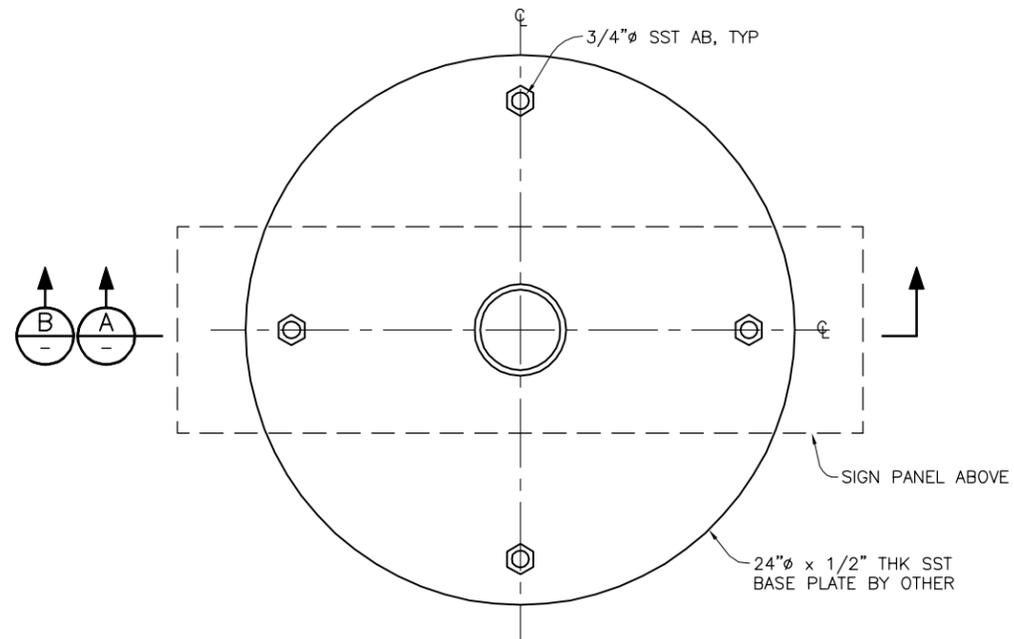
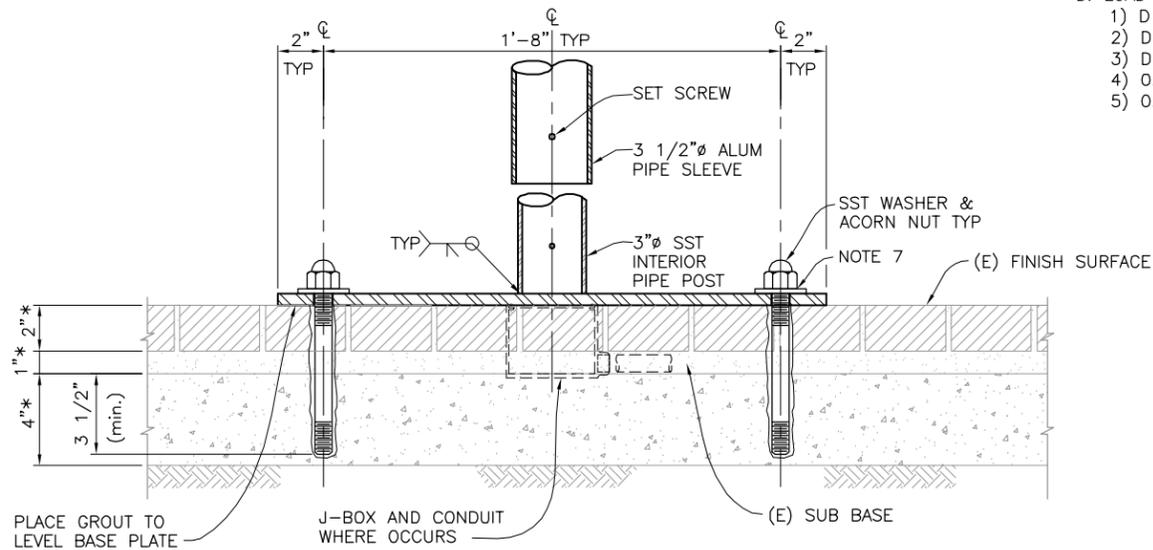


PLATE DETAIL 1
SCALE: 3" = 1'-0"



TYPICAL KIOSK BASE PLATE DETAIL A
SCALE: 3" = 1'-0"

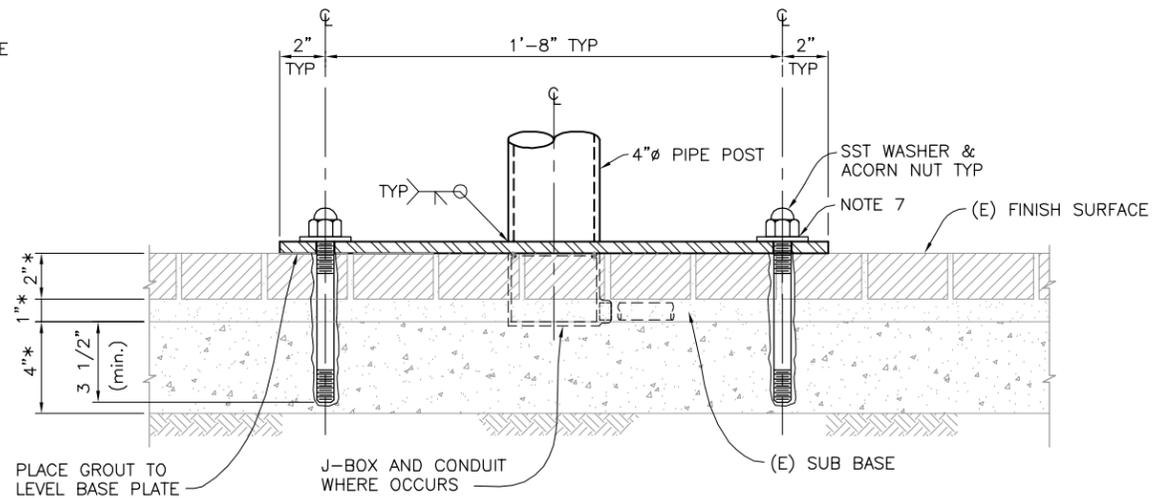
NOTES:

- THIS DRAWING IS LIMITED TO ANCHOR SYSTEM ONLY. ALL OTHER MEMBERS RELATED TO STREET KIOSK, BASE PLATE, AND ITS CONNECTION BETWEEN KIOSK POST AND BASE PLATE, ARE NOT COVERED IN THIS DRAWING.
- THE CONTRACTOR SHALL FIELD VERIFY EXISTING CONDITIONS PERTINENT TO THE WORK PRIOR TO MATERIAL FABRICATION AND/OR CONSTRUCTION. FIELD CONDITIONS DIFFERENT FROM THOSE NOTED ON THE DRAWINGS SHALL BE PROMPTLY BROUGHT TO THE ATTENTION OF THE ENGINEER.
- ANY DISCREPANCIES BETWEEN THE EXISTING CONDITIONS AND THE CONTRACT DOCUMENTS SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER.
- BASIS OF DESIGN**
 - WIND LOAD:** REFER TO CBC SECTION 1609.
 - BASIC WIND SPEED: 85 MPH
 - SURFACE ROUGHNESS CATEGORY: B
 - EXPOSURE CATEGORY: B
 - IMPORTANCE FACTOR FOR WIND LOAD: 1.0
 - SEISMIC LOAD:** REFER TO CBC SECTION 1613
 - SITE CLASS: D
 - SEISMIC DESIGN CATEGORY: D
 - MAPPED MCE SPECTRAL RESPONSE ACCELERATION
 - S_s = 1.5g
 - S₁ = 0.604g
 - SITE COEFFICIENT
 - F_a = 1.0
 - F_v = 1.5
 - IMPORTANCE FACTOR: 1.0
 - LOAD COMBINATIONS: LRFD**
 - 1.4D
 - 1.2D + 1.6W + L
 - 1.2D + 1.0E + L
 - 0.9D + 1.6W
 - 0.9D + 1.0E
 - LOAD COMBINATIONS: ASD**
 - D
 - D + W
 - D + 0.7E
 - 0.6D + W
 - 0.6D + 0.7E

- ALL ANCHORS SHOWN ON THE DRAWING HAVE BEEN DESIGNED BASED UPON THE FOLLOWING:
 - ADHESIVE: HILTI HIT-RE 500-SD EPOXY ADHESIVE ANCHORING SYSTEM.
 - ANCHORS: HILTI HAS-R 316 STAINLESS STEEL THREADED ROD CONFORMING TO ASTM F 593
 - NUTS: HILTI HAS-R 316 STAINLESS STEEL NUT CONFORMING TO ASTM F 594
 - ASSUMPTION OF EXISTING CONCRETE BASE: 4 INCH THICK 2500 PSI CRACKED CONCRETE CONDITION
 - STAINLESS STEEL BASE PLATE WITH MIN 45000 PSI YIELD STRENGTH
- CONTRACTOR MAY SUBMIT AN ALTERNATIVE ADHESIVE ANCHORING SYSTEM TO THE ENGINEER FOR APPROVAL, PROVIDED THAT THE REQUIREMENTS OF ICC-ES AC308 CRACKED CONCRETE CONDITION ARE MET.
- APPLY LOCTITE TO THE TOP OF ANCHOR BOLT PRIOR TO TIGHTENING THE BOLT NUT.
- THE CORROSION PROTECTION, INCLUDING PAINTING AND COATING, OF THE PLATE SHALL BE APPLIED PRIOR TO INSTALLATION OF ANCHORS.

ABBREVIATIONS:

- (E) EXISTING
- AB ANCHOR BOLT
- SST STAINLESS STEEL
- THK THICK
- TYP TYPICAL



TYPICAL POST BASE PLATE DETAIL B
SCALE: 3" = 1'-0"

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DATE:	MARCH 2012

REGIONAL TRANSIT WAYFINDING GUIDELINES & STANDARDS



STANDARD DRAWINGS

TYPICAL KIOSK AND POST BASE PLATE DETAILS

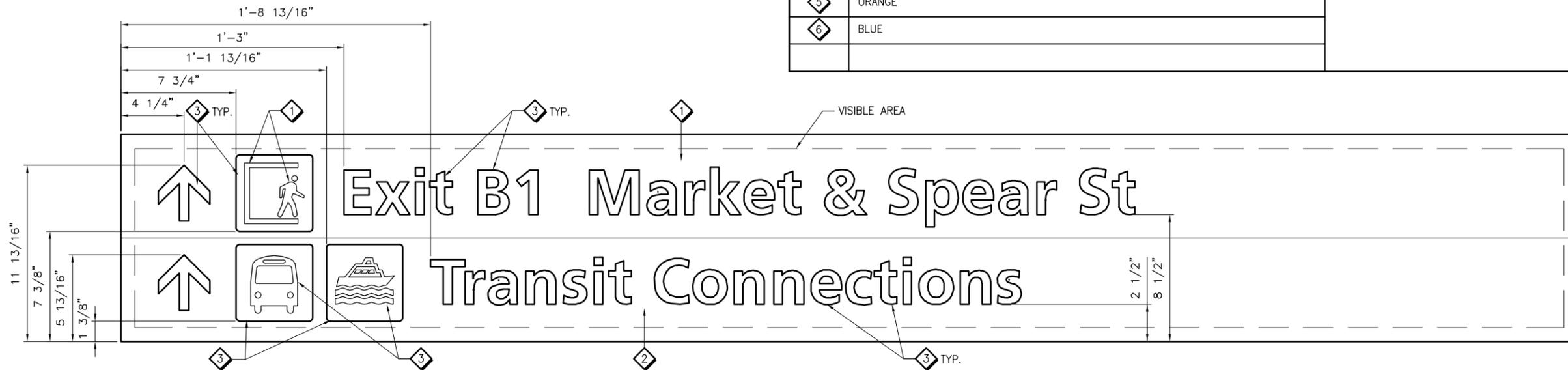
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CONTRACT NO.	REV.
CONTRACT SHEET NO.	PAGE NO.
	005

REV.	DATE	BY	SUB	APP.	DESCRIPTION
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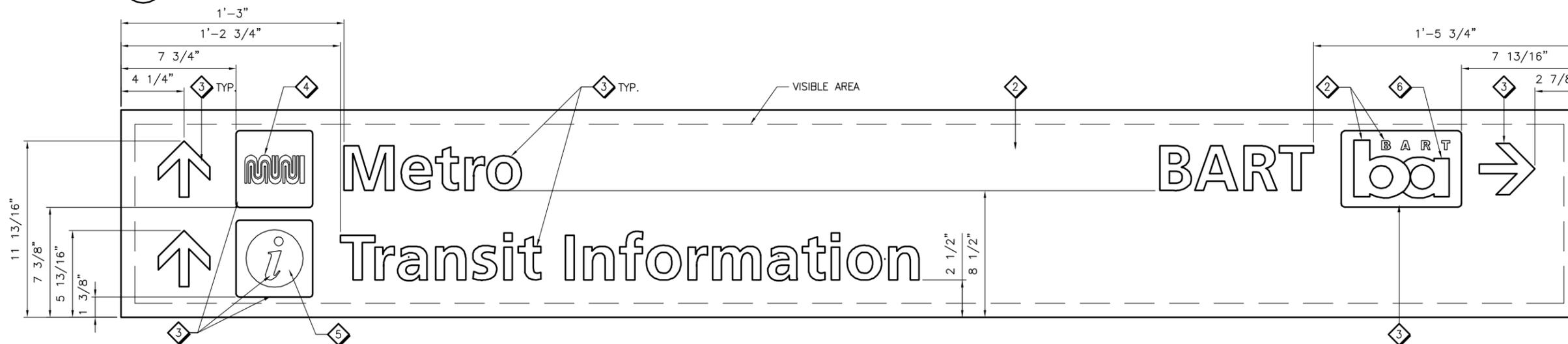
RELEASE 1.0d MARCH 2012

COLOR SCHEDULE

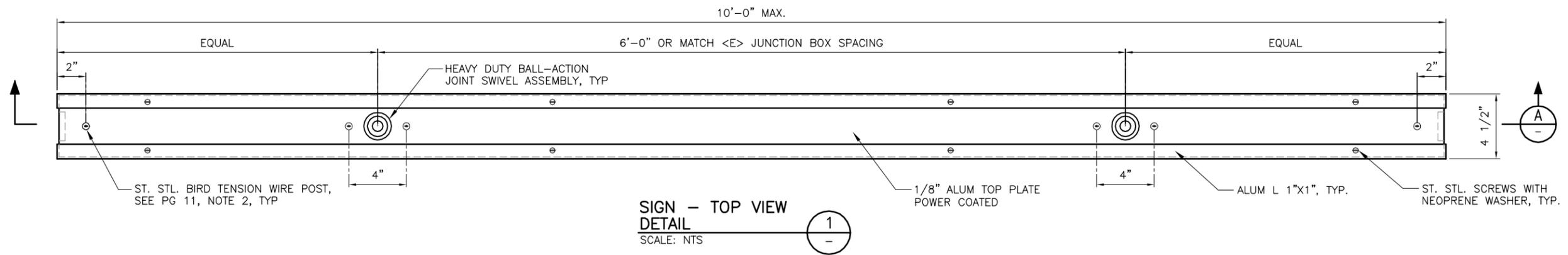
NOTE NUMBER	COLOR DESCRIPTION	REMARKS
1	SAFETY GREEN	SEE SPECIFICATIONS FOR PANTONE COLOR INFORMATION
2	BLACK	
3	WHITE	
4	RED	
5	ORANGE	
6	BLUE	



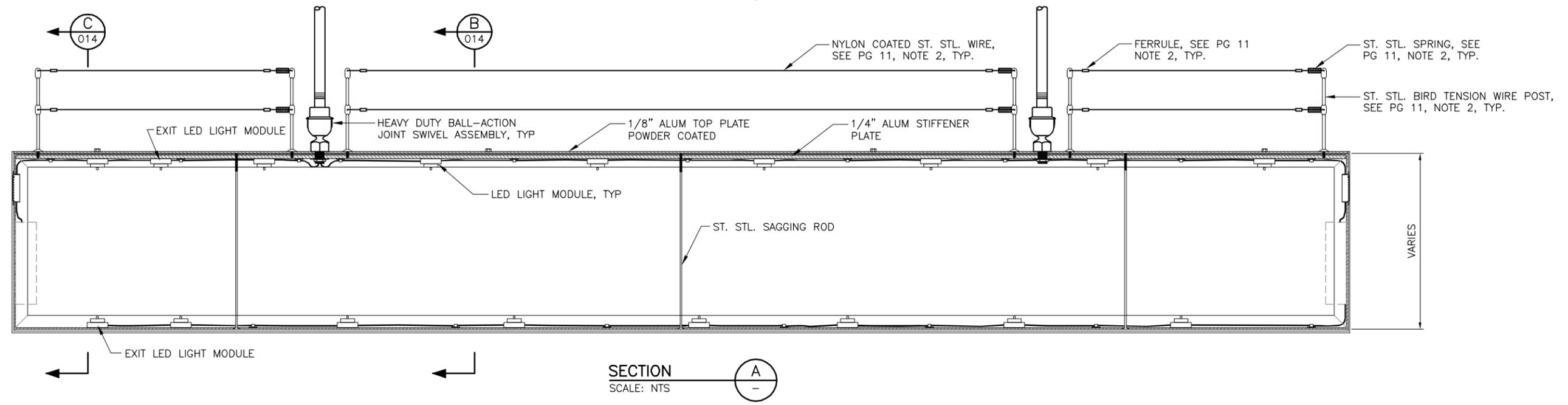
1 DETAIL: SAMPLE SIGN FACE
SCALE: 1 1/2"=1'-0"



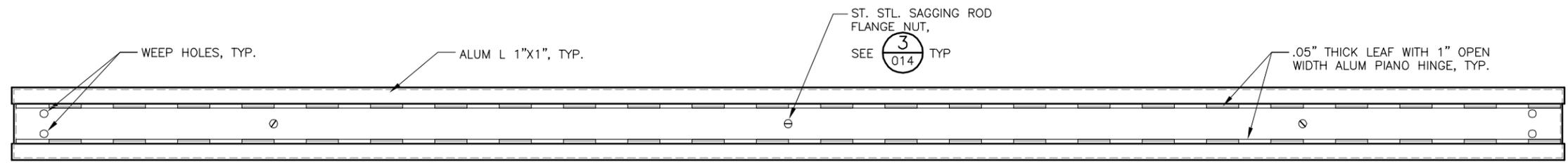
2 DETAIL: SAMPLE SIGN FACE
SCALE: 1 1/2"=1'-0"



**SIGN - TOP VIEW
DETAIL**
SCALE: NTS



SECTION
SCALE: NTS



**SIGN - BOTTOM VIEW
DETAIL**
SCALE: NTS

NOTE:
FOR FINISHES OF CABINET, ANGLES, AND FASTENERS, SEE SPECIFICATIONS.

REV.	DATE	BY	SUB	APP.	DESCRIPTION

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DATE:	MARCH 2012

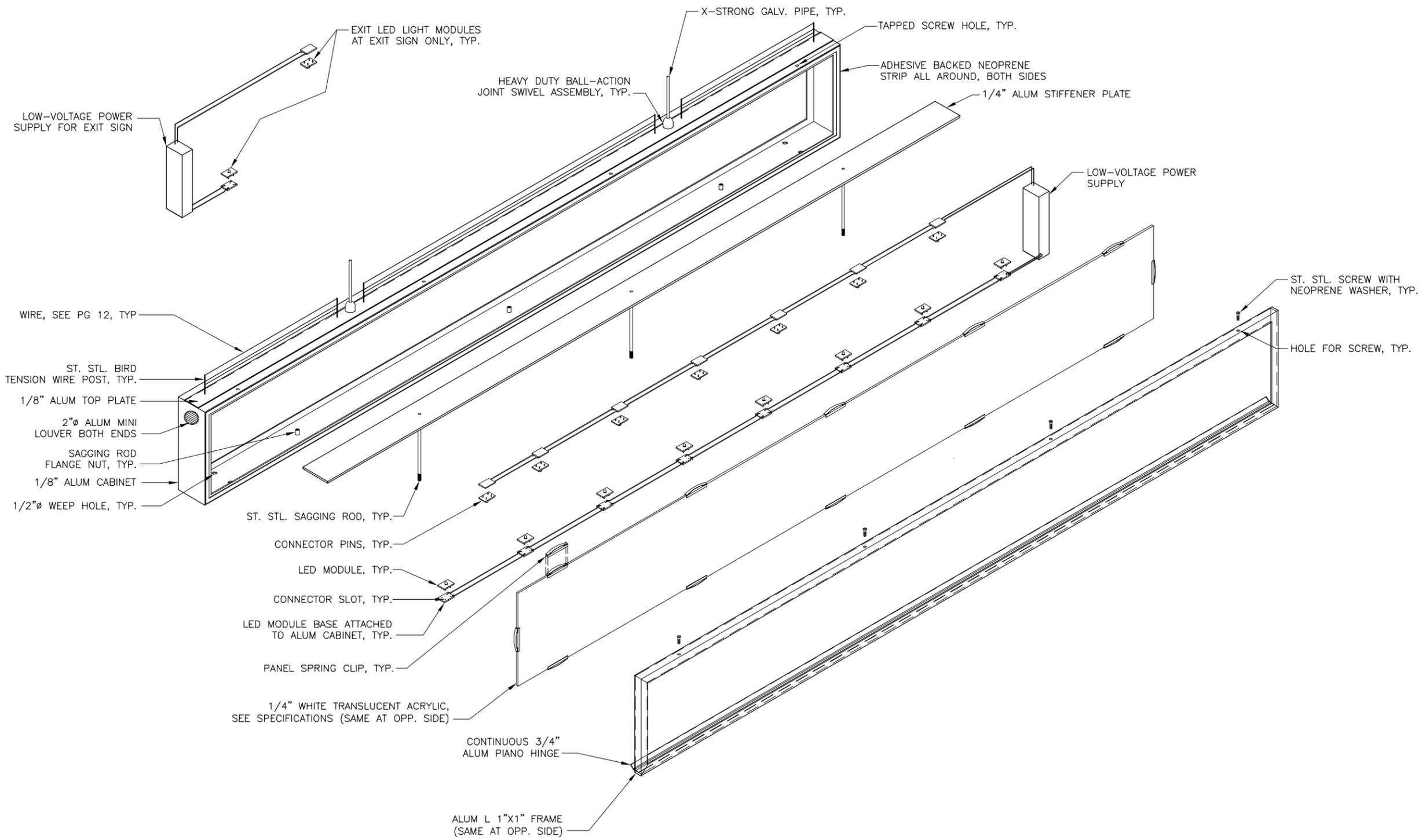
REGIONAL TRANSIT WAYFINDING GUIDELINES & STANDARDS



STANDARD DRAWINGS

OVERHEAD WAYFINDING ILLUMINATED CABINET SIGN
PLANS AND SECTIONS

CADD FILENAME	
SIZE:	SCALE
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CONTRACT NO.	REV.
CONTRACT SHEET NO.	PAGE NO.
	012



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DATE:	MARCH 2012

REGIONAL TRANSIT WAYFINDING GUIDELINES & STANDARDS

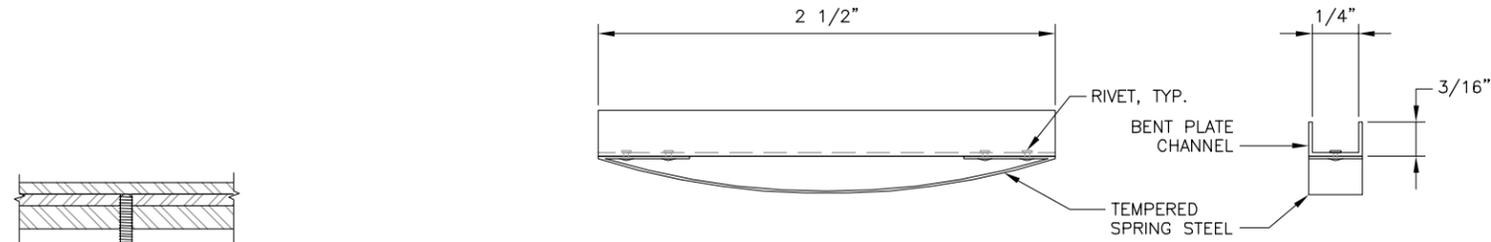
METROPOLITAN
TRANSPORTATION
COMMISSION

STANDARD DRAWINGS

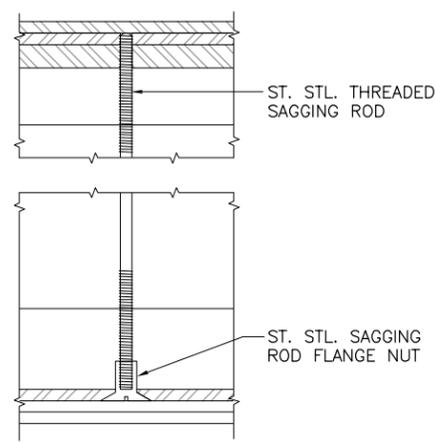
OVERHEAD WAYFINDING ILLUMINATED CABINET SIGN
ASSEMBLY DIAGRAM

CADD FILENAME	
SIZE: SCALE	
D	
CONTRACT NO.	REV.
CONTRACT SHEET NO.	PAGE NO.
	013

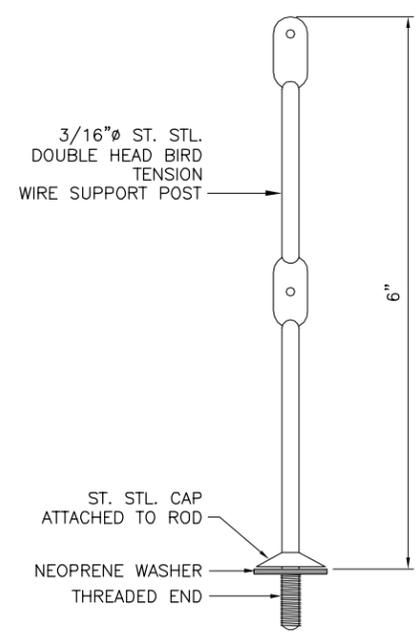
RELEASE 1.0d MARCH 2012



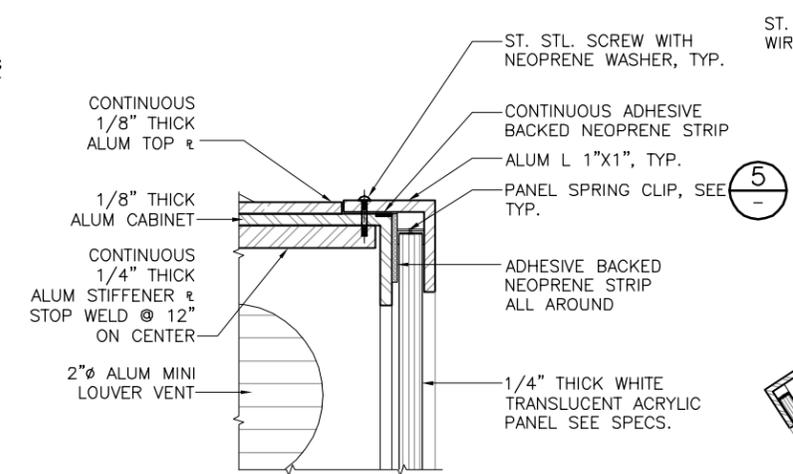
DETAIL 5
SCALE: 2:1



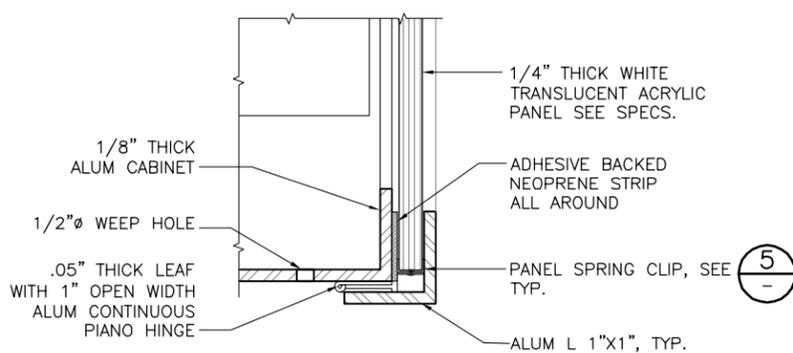
DETAIL 3
SCALE: 1" = 1"



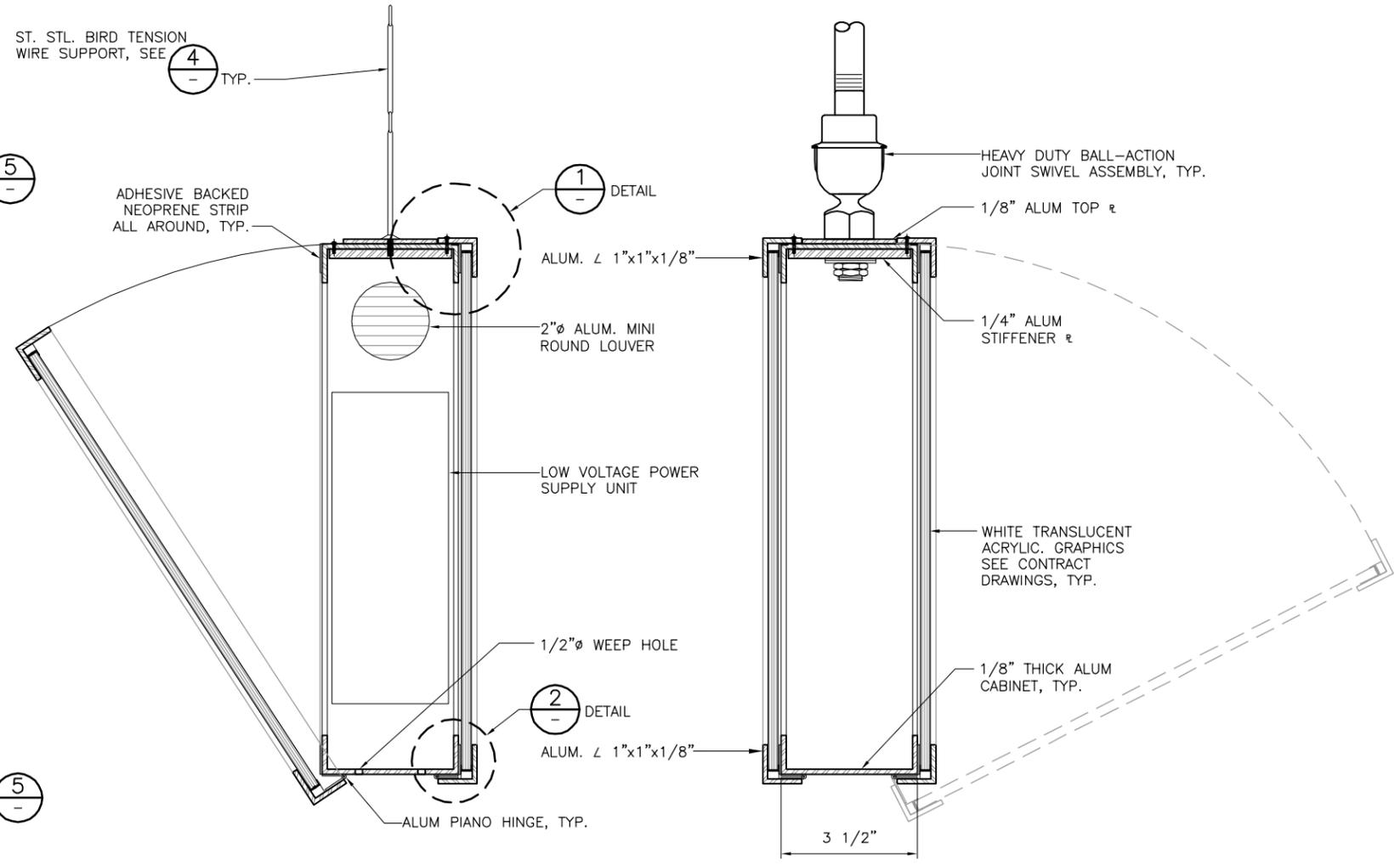
DETAIL 4
SCALE: 1" = 1"



DETAIL 1
SCALE: 1" = 1"



DETAIL 2
SCALE: 1" = 1"



SECTION C
SCALE: 6" = 1'-0"

SECTION B
SCALE: 6" = 1'-0"

REV.	DATE	BY	SUB	APP.	DESCRIPTION

DESIGNED:	
DRAWN:	
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DATE:	MARCH 2012

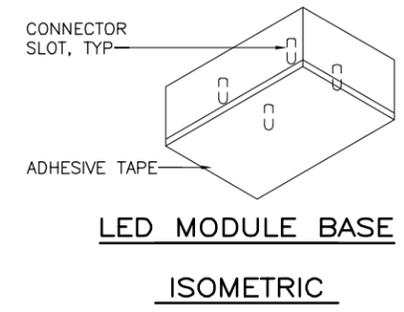
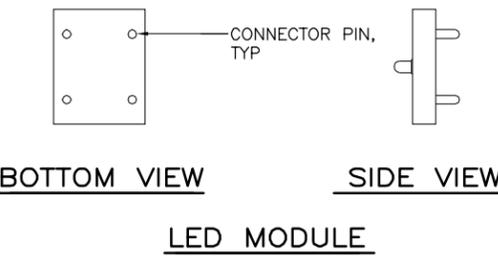
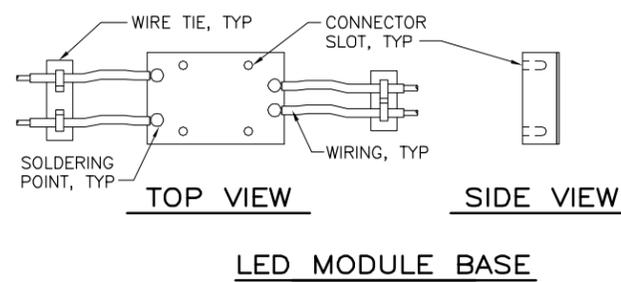
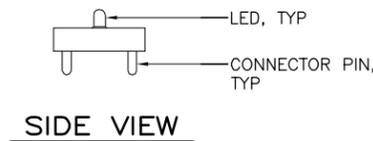
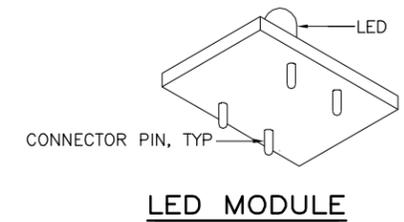
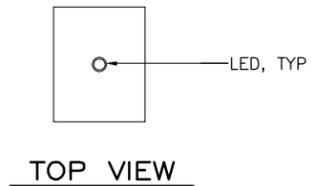
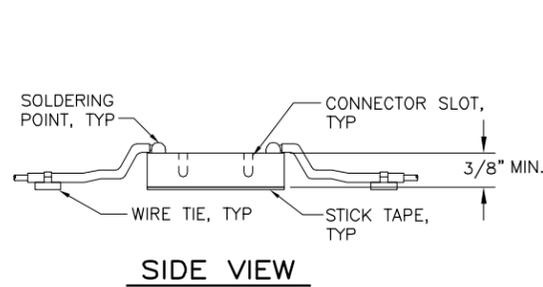
REGIONAL TRANSIT WAYFINDING GUIDELINES & STANDARDS

STANDARD DRAWINGS

OVERHEAD WAYFINDING SIGN
SECTIONS AND DETAILS

CADD FILENAME	
SIZE:	SCALE
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CONTRACT NO.	REV.
CONTRACT SHEET NO.	PAGE NO.
	014

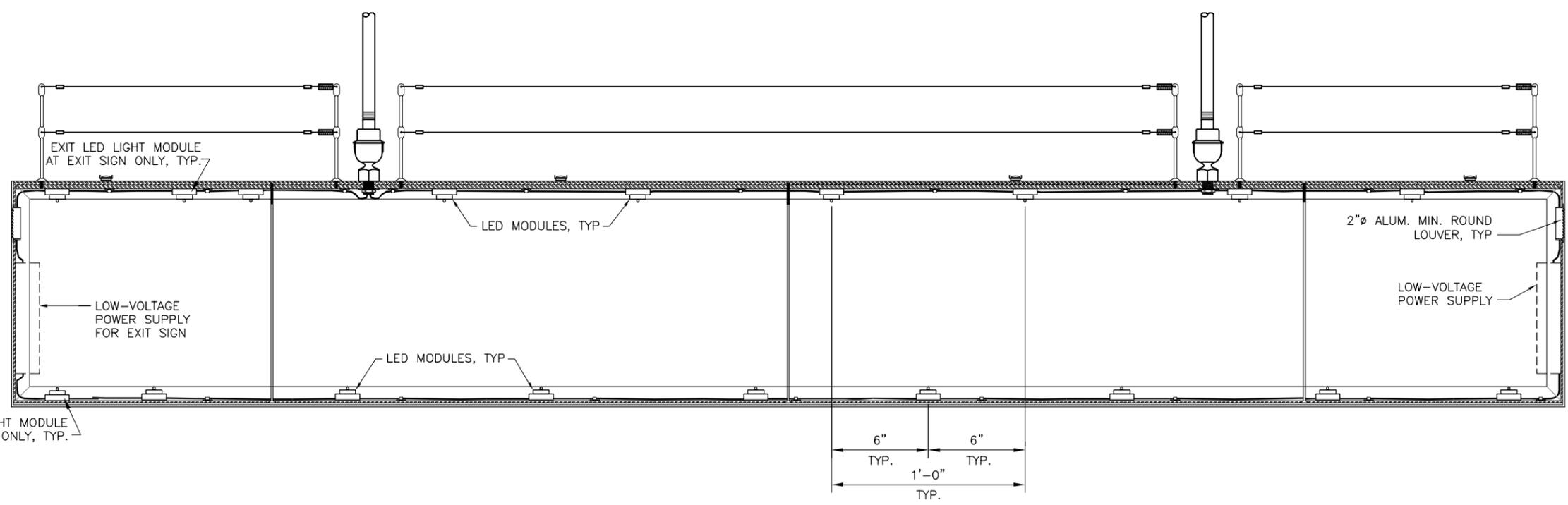
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LED MODULE
SCALE: FULL SIZE

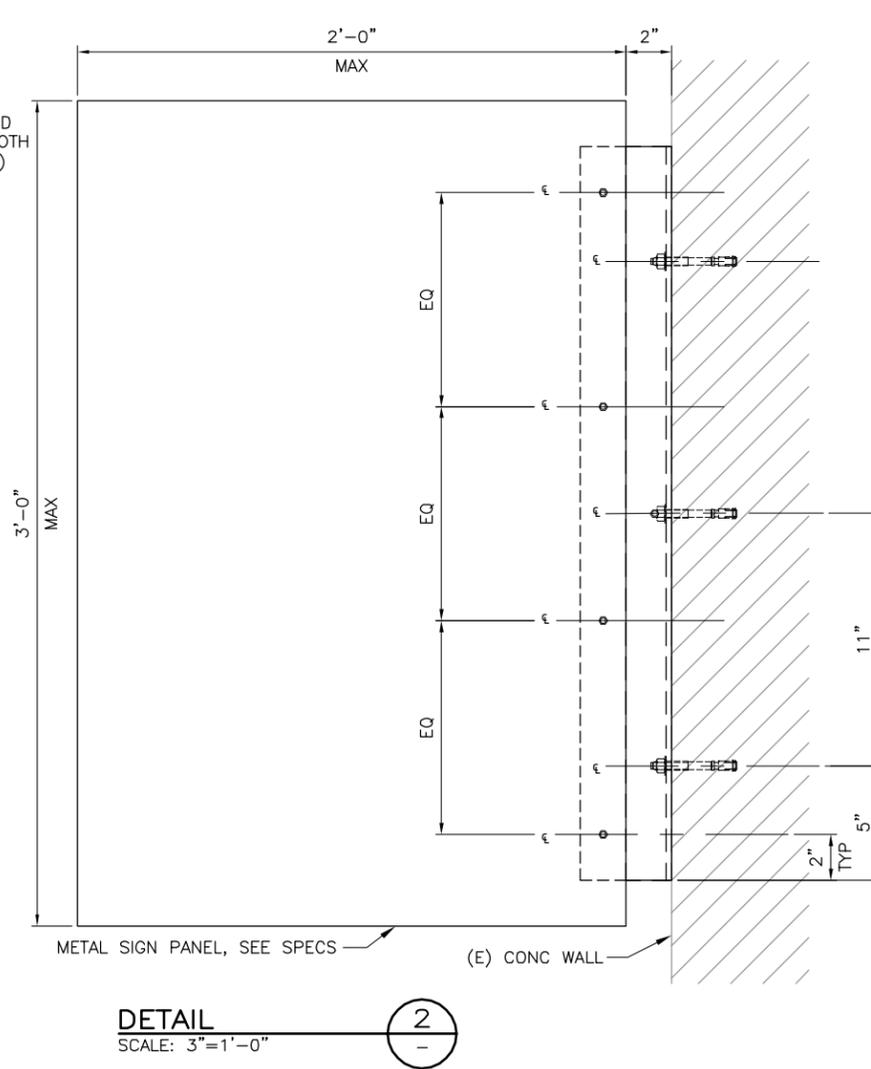
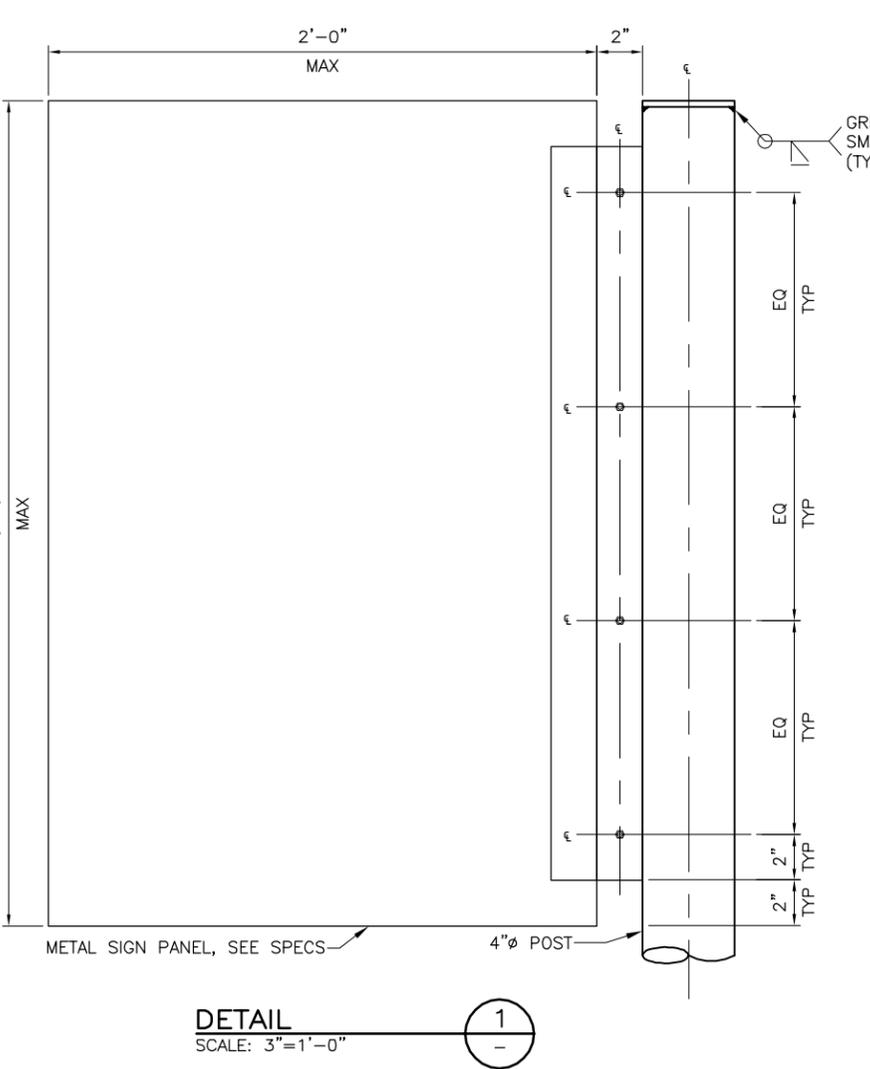
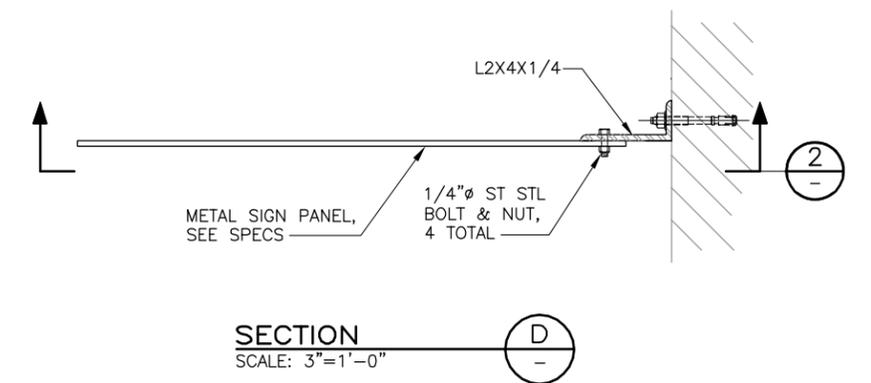
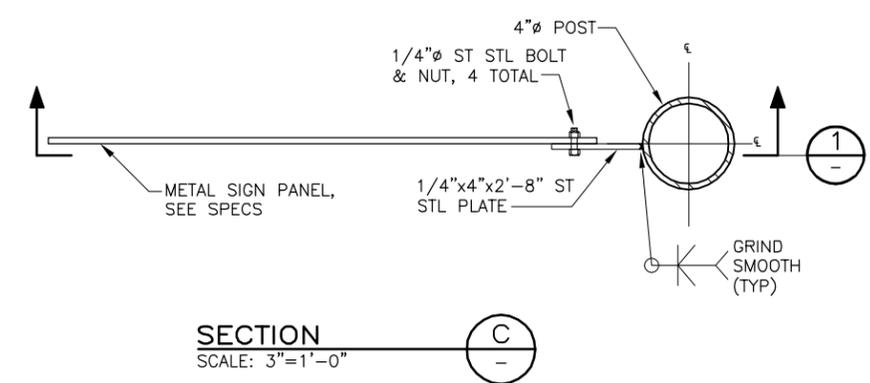
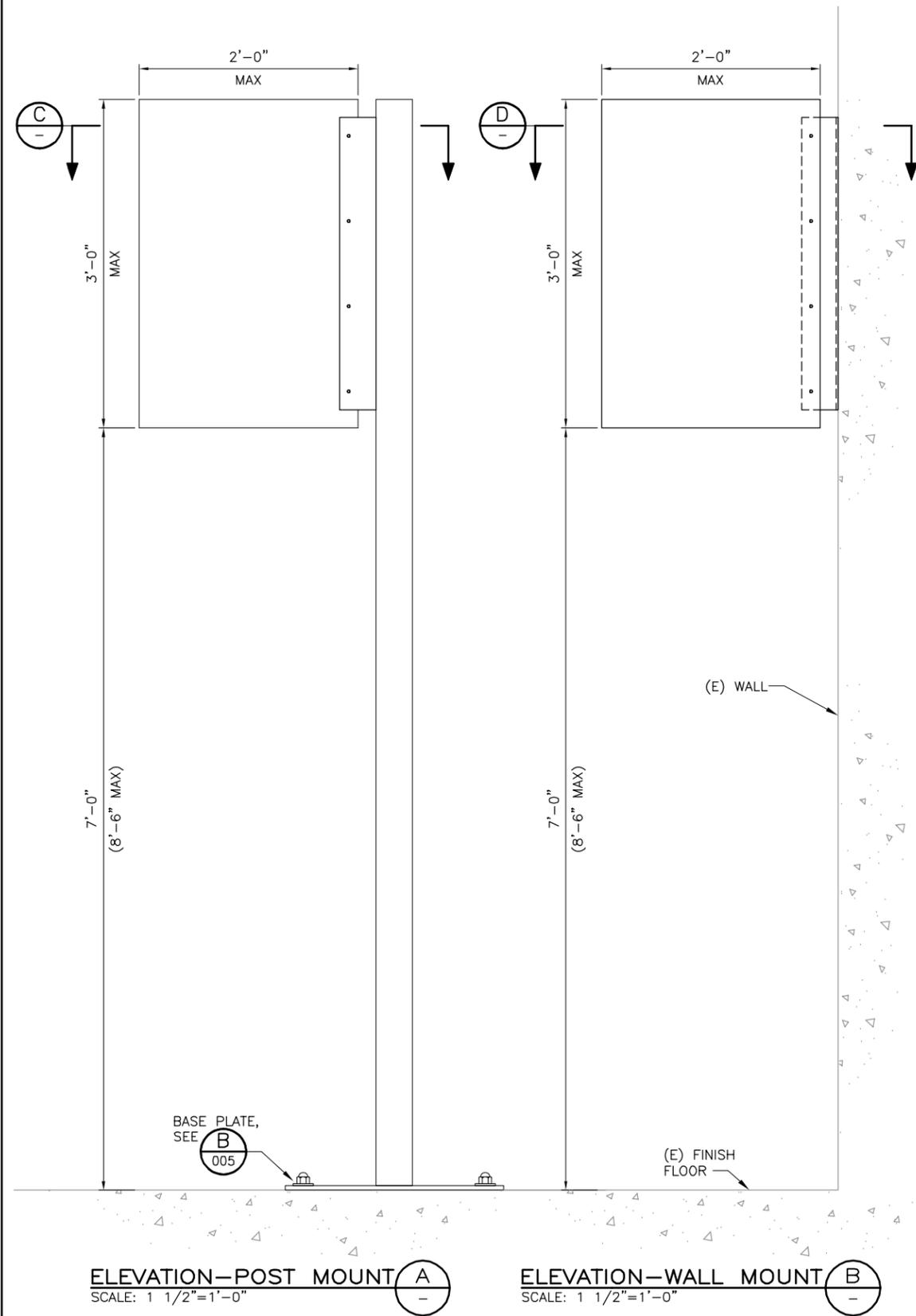
(A)

- GENERAL NOTES:**
1. THE LED SHALL BE RATED 100 LUMEN PER WATT, MOUNTED ON AND DRIVEN BY A LIGHT ENGINE MODULE CAPABLE OF DELIVERING 195 LUMENS AT 1.0A IN A CONSTANT-CURRENT CONFIGURATION. THE LED SHALL BE PROVIDED WITH GOLD-PLATED PINS TO BE INSERTED INTO SOCKETS EMBEDDED IN LIGHT ENGINE MODULE. ALTERNATELY, THE LED AND THE LIGHT ENGINE MODULE MAY BE INTEGRATED ON A PRINTED CIRCUIT BOARD AS SHOWN ON THE DRAWING. THE INTEGRATED MODULE SHALL BE PROVIDED WITH GOLD-PLATED PINS TO BE INSERTED INTO SOCKETS EMBEDDED IN AN INTERFACE BASE MODULE. THE BASE MODULE SHALL BE PROVIDED WITH SOLDERING POINTS FOR EXTERNAL COPPER WIRES.
 2. IN EITHER CONFIGURATION (SEE ABOVE), THE PINS OF THE LED OR THE INTEGRATED MODULE SHALL BE RIGID FOR THE LED OR THE MODULE TO BE EASILY EXTRACTED WITHOUT INCURRING DAMAGE TO THE PINS OR DEGRADING THE ELECTRICAL CONTACT. THE INTEGRATED MODULE SHALL PLUG INTO SPACERS ON THE BASE MODULE FOR PHYSICAL SUPPORT.
 3. EACH CABINET PRIMARY ELECTRICAL LOAD IS 277VAC/2.0A. EMERGENCY EXIT LIGHTING CIRCUIT VOLTAGE MAY BE 120VDC/2.0A OR 120VAC/2.0A, AS SPECIFIED BY THE DISTRICT VERIFY IN FIELD.
 4. LEDS ARE STAGGERED, SEE (B)



SECTION B
SCALE: 3" = 1'-0"

DESIGNED: DRAWN: CHECKED: APPROVED: DATE: MARCH 2012					REGIONAL TRANSIT WAYFINDING GUIDELINES & STANDARDS		STANDARD DRAWINGS		CADD FILENAME	
RELEASE 1.0d MARCH 2012					 METROPOLITAN TRANSPORTATION COMMISSION		OVERHEAD WAYFINDING ILLUMINATED CABINET SIGN LED MODULE ASSEMBLY		SIZE: SCALE D	
REV. DATE BY SUB APP. DESCRIPTION									CONTRACT NO. REV.	
									CONTRACT SHEET NO. PAGE NO. 015	



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REGIONAL TRANSIT WAYFINDING GUIDELINES & STANDARDS



METROPOLITAN TRANSPORTATION COMMISSION

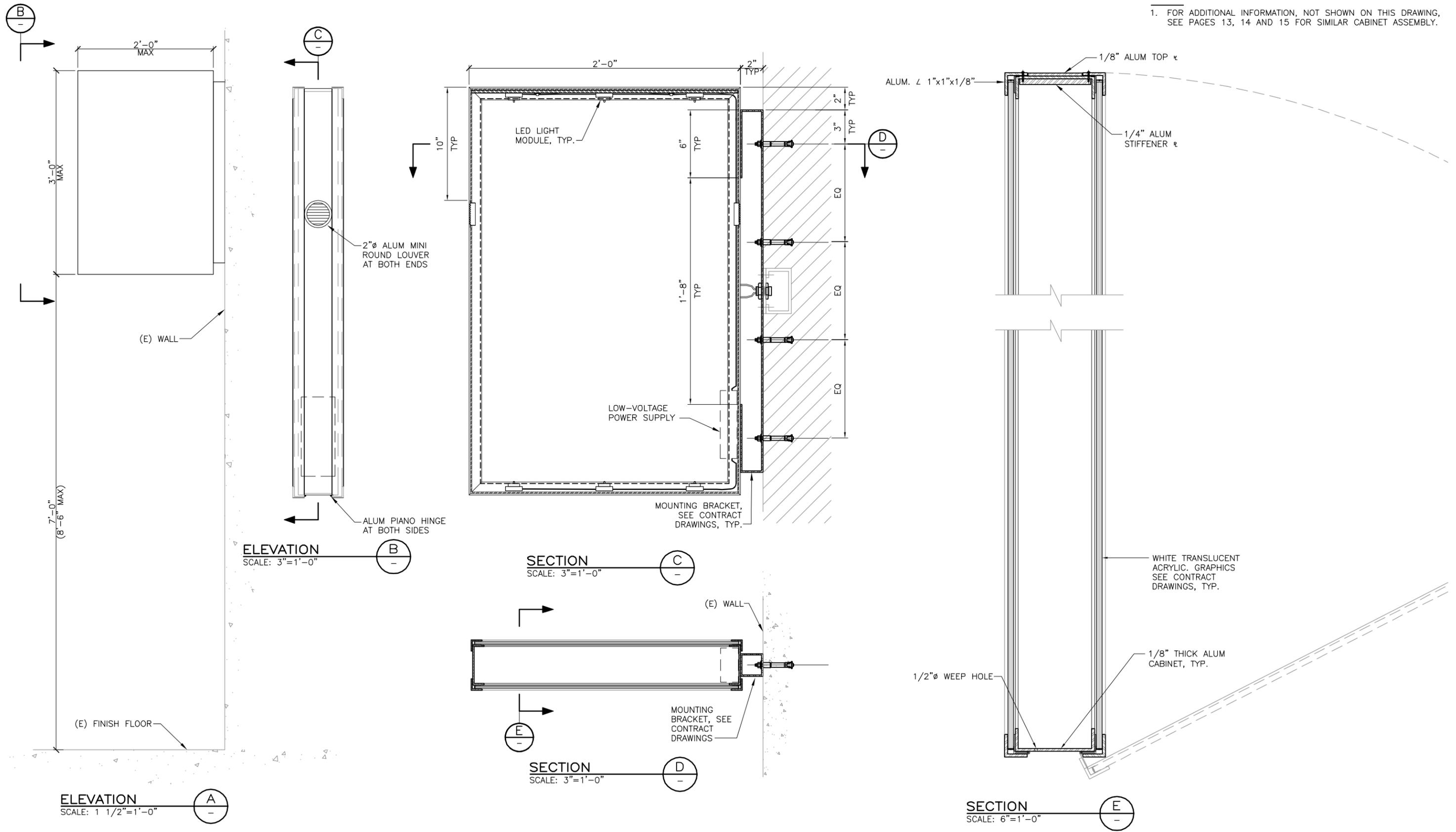
STANDARD DRAWINGS

FLAG DIRECTIONAL SIGN
NON ILLUMINATED
ELEVATIONS, SECTIONS AND DETAILS

CADD FILENAME	
SIZE: SCALE	
CONTRACT NO.	REV.
CONTRACT SHEET NO.	PAGE NO.
	016

NOTES:

1. FOR ADDITIONAL INFORMATION, NOT SHOWN ON THIS DRAWING, SEE PAGES 13, 14 AND 15 FOR SIMILAR CABINET ASSEMBLY.



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REGIONAL TRANSIT WAYFINDING GUIDELINES & STANDARDS


METROPOLITAN TRANSPORTATION COMMISSION

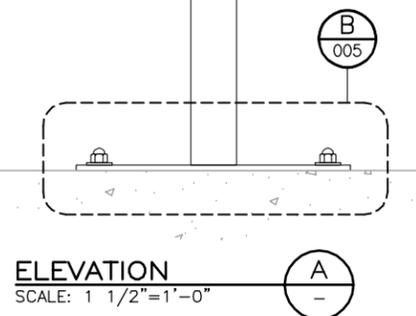
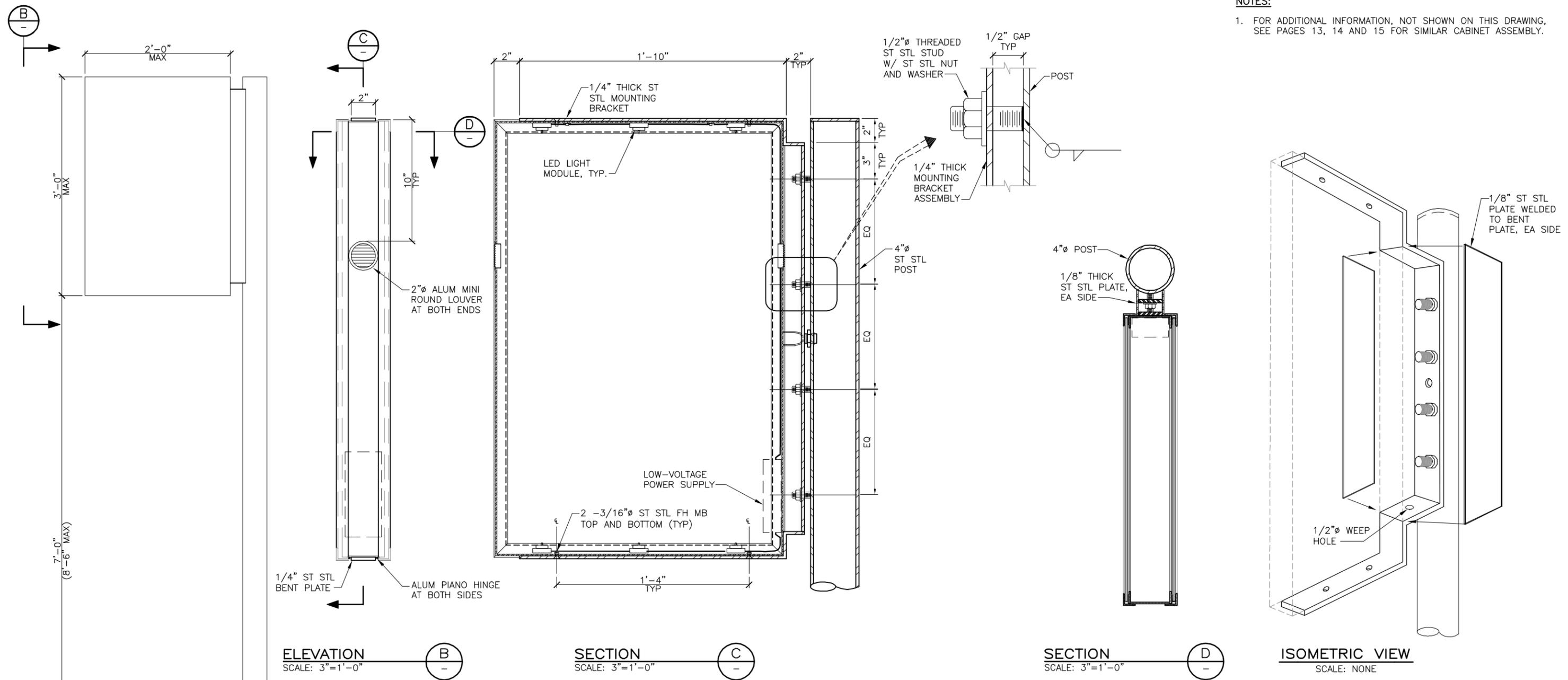
STANDARD DRAWINGS

FLAG, WALL MOUNTED, DIRECTIONAL SIGN
BACKLIT ILLUMINATED
ELEVATIONS AND SECTIONS

CADD FILENAME	
SIZE: SCALE	
D	
CONTRACT NO.	REV.
CONTRACT SHEET NO.	PAGE NO.
	017

NOTES:

1. FOR ADDITIONAL INFORMATION, NOT SHOWN ON THIS DRAWING, SEE PAGES 13, 14 AND 15 FOR SIMILAR CABINET ASSEMBLY.



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APPROVED:	
DATE:	MARCH 2012

REGIONAL TRANSIT WAYFINDING GUIDELINES & STANDARDS



METROPOLITAN
TRANSPORTATION
COMMISSION

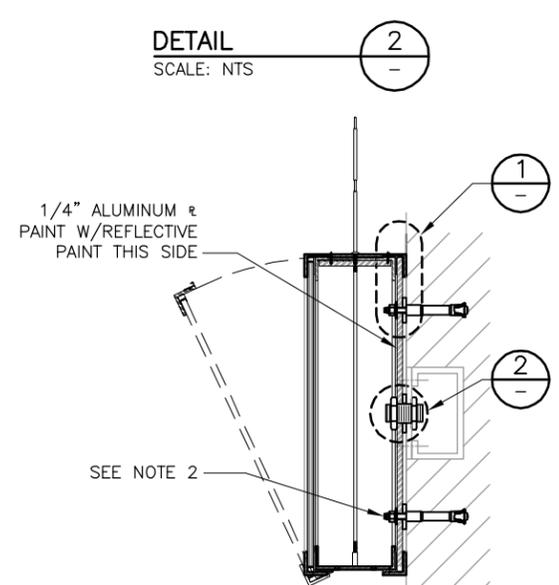
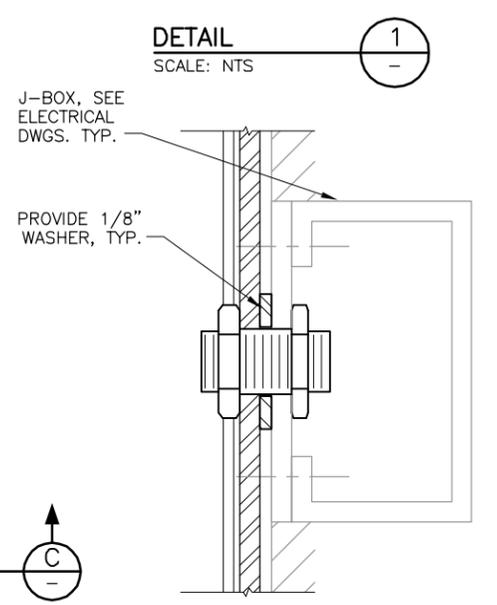
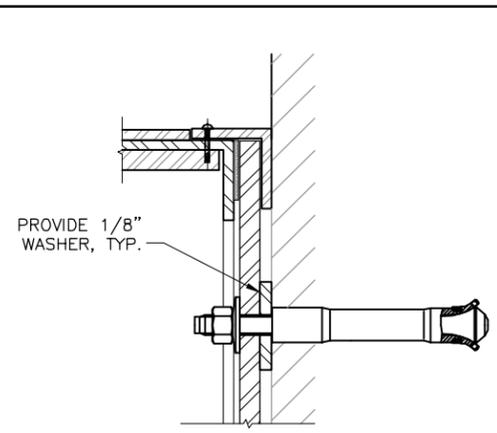
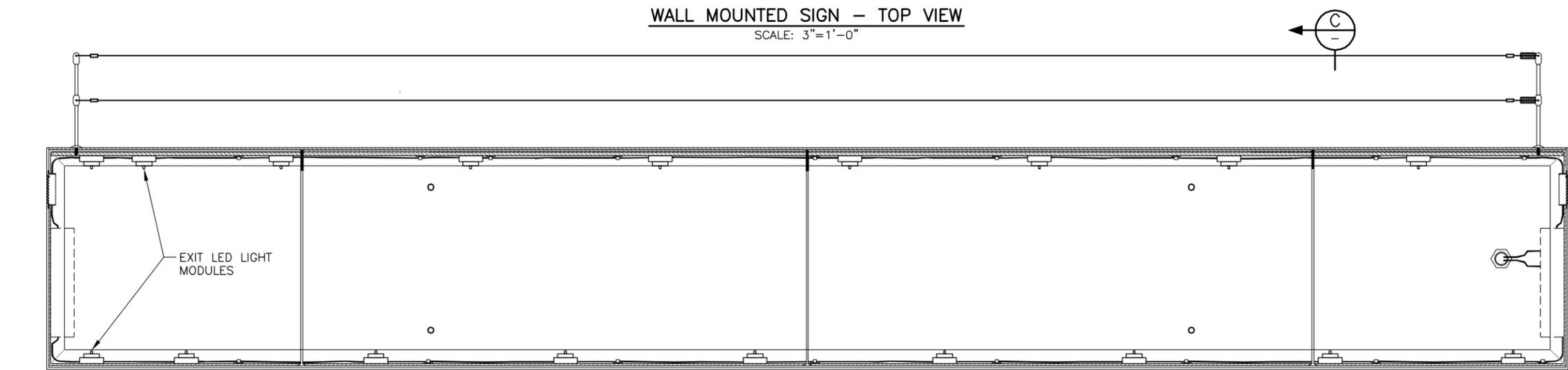
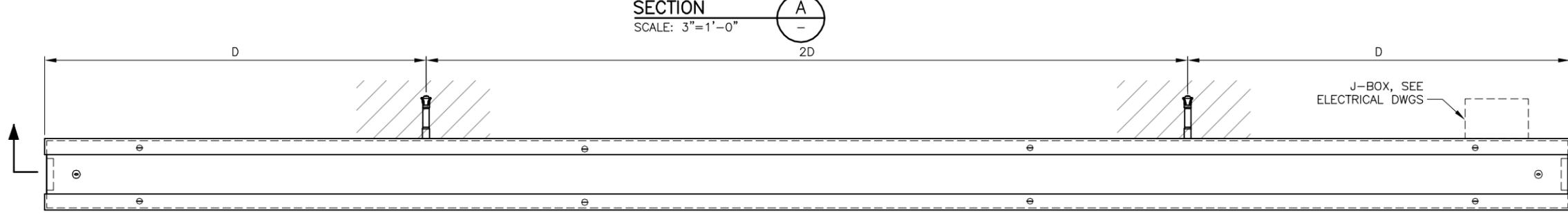
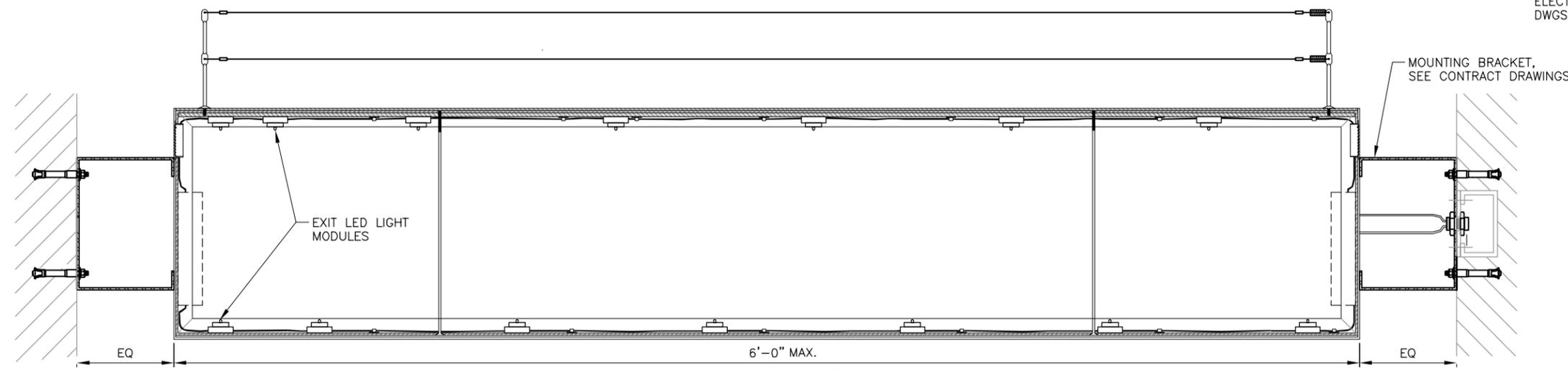
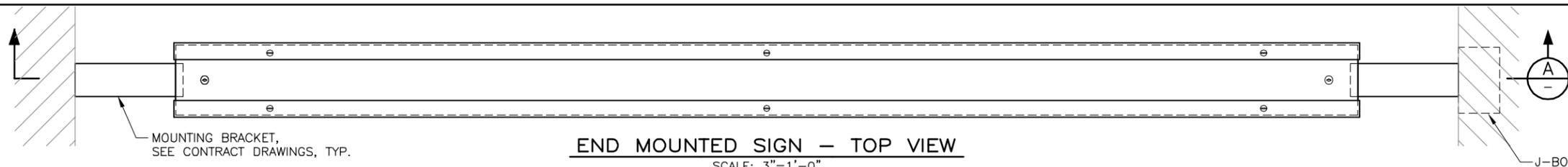
STANDARD DRAWINGS

FLAG, POLE MOUNTED, DIRECTIONAL SIGN
BACKLIT ILLUMINATED
ELEVATIONS AND SECTIONS

CADD FILENAME	
SIZE: SCALE	
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CONTRACT NO.	REV.
CONTRACT SHEET NO.	PAGE NO.
	018

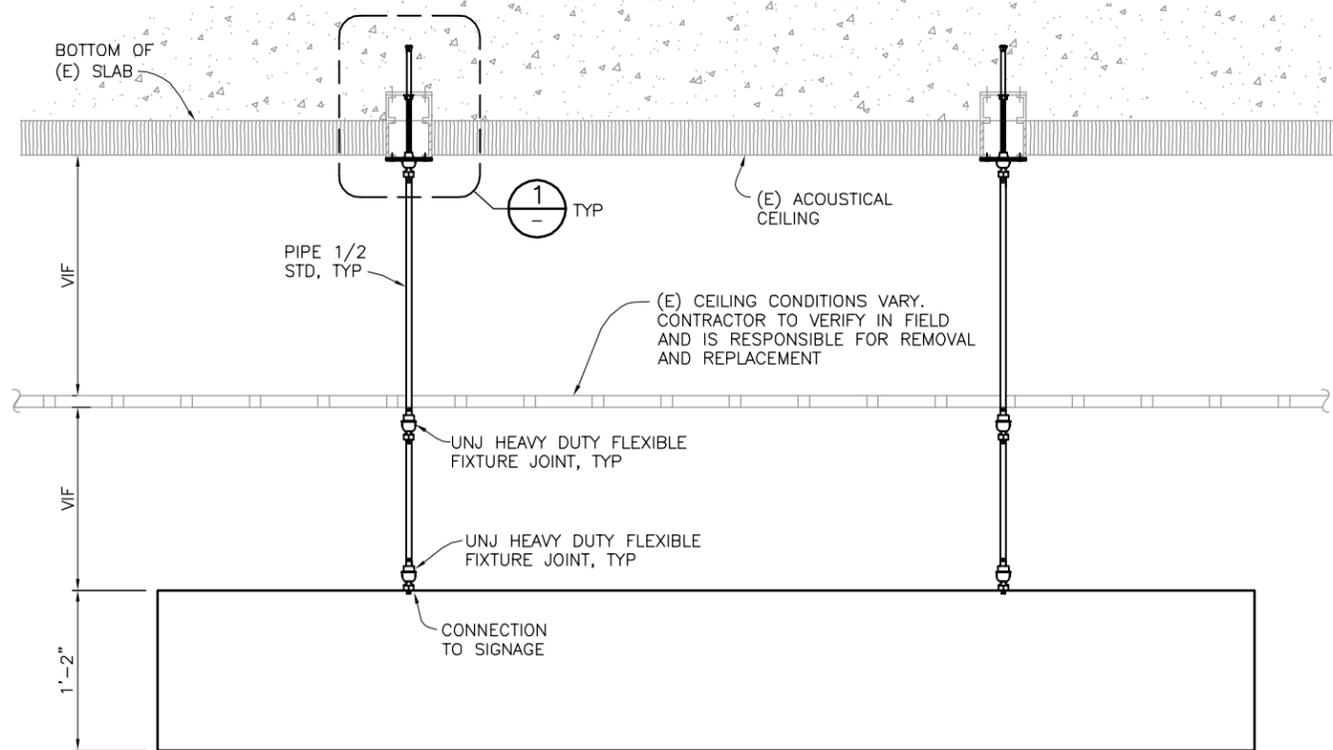
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REV. DATE BY SUB APP. DESCRIPTION

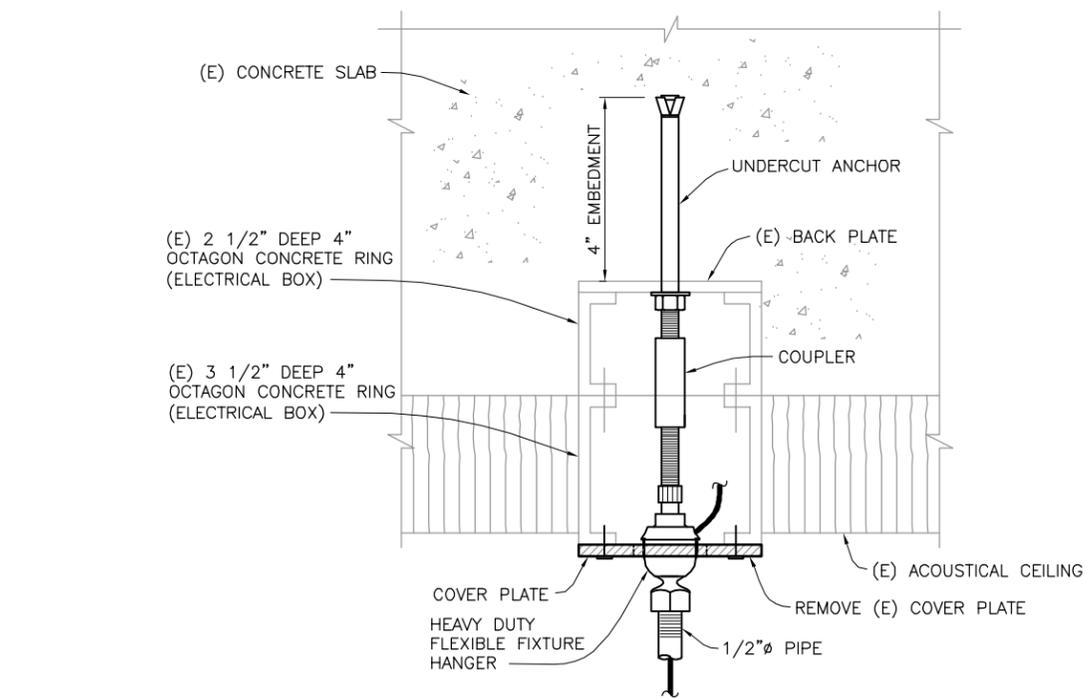


- NOTES:**
1. FOR FINISHES OF CABINET, ANGLES, AND FASTENERS, SEE SPECIFICATIONS.
 2. USE 1/2"Ø HILTI KBTZ OR SIMPSON STRONG-BOLT EXPANSION ANCHOR OR EQUAL FOR CONC. WALL & USE 1/2"Ø HILTI KB3 OR SIMPSON WEDGE - ALL EXPANSION ANCHOR OR EQUAL FOR MASONRY WALL.

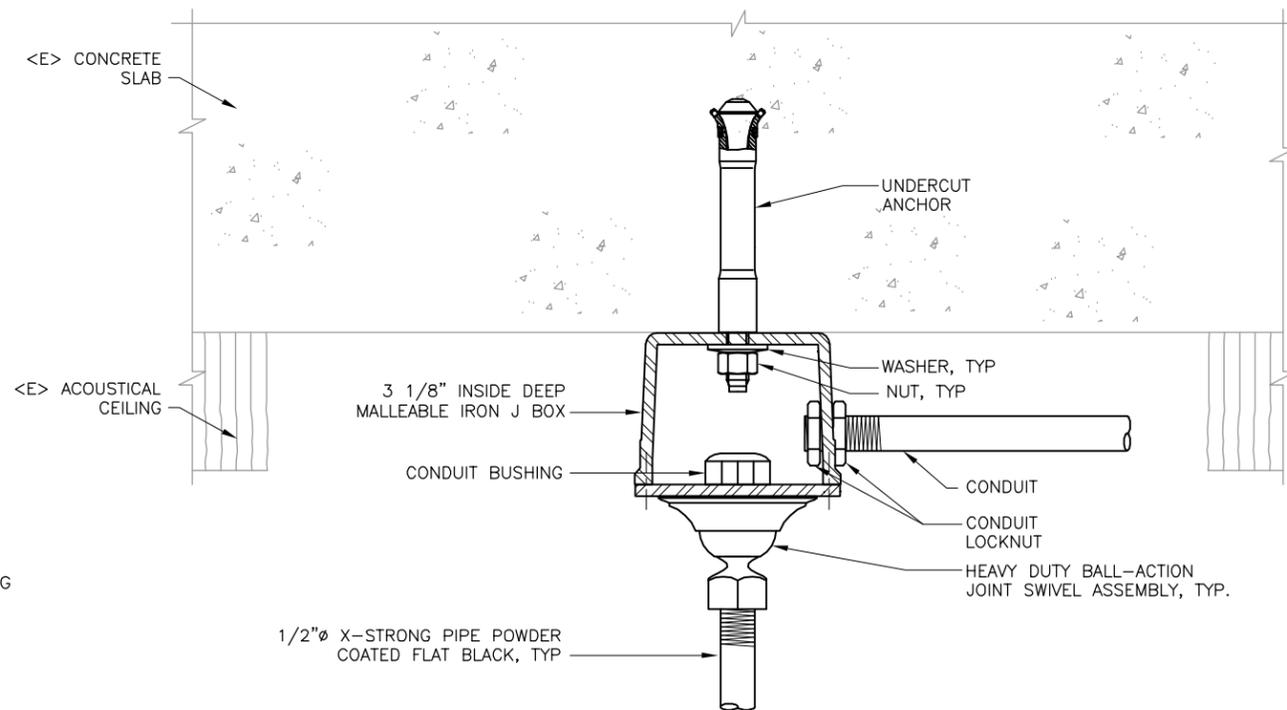
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RELEASE 1.0d MARCH 2012					 METROPOLITAN TRANSPORTATION COMMISSION			ALTERNATIVE SIGN MOUNTING METHODS			SIZE: SCALE D	
REV. DATE BY SUB APP. DESCRIPTION					CONTRACT NO.			REV.		CONTRACT SHEET NO. PAGE NO.		
										019		



SIGN - ELEVATION
SCALE: 1 1/2" = 1'-0"



DETAIL (WITH (E) J BOX) ①
SCALE: 6" = 1'-0"



DETAIL (WITHOUT (E) J BOX) ②
SCALE: 6" = 1'-0"

NOTES:

THE FOLLOWING NOTES AND DETAILS ARE EXAMPLES OF ANCHORAGE FOR SIGNAGE AT AN EXISTING STATION:

- ALL THE ITEMS SHOWN ON THIS DRAWING SHALL BE NEW EXCEPT FOR ITEMS MARKED AS (E) OR EXIST.
- EXISTING DATA SHOWN ON THIS DRAWING WAS COMPILED FROM INFORMATION FURNISHED BY FIELD INVESTIGATION. FIELD CONDITIONS DIFFERENT FROM THOSE NOTED ON THE DRAWINGS SHALL BE PROMPTLY BROUGHT TO THE ATTENTION OF THE ENGINEER.
- EXISTING REINFORCING AND CAST-IN-PLACE CONDUITS SHALL BE LOCATED (BY RADAR OR OTHER MEANS) PRIOR TO INSTALLING ANCHORS.
- THE (E) SIGN SHALL BE DE-ENERGIZED PRIOR TO PERFORMING THE FOLLOWING WORK:
A. DRILLING OF HOLES FOR THE POST-INSTALLED ANCHORS.
B. REMOVING OF EXISTING SIGNS AND THEIR ACCESSORIES.
- BASIS OF DESIGN (SHALL BE ESTABLISHED FOR SPECIFIC SIGN)
A. LIVE LOAD: 0 LBS (NO DESIGN FOR VANDALISM)
B. WIND LOAD: REFER TO CBC SECTION 1609.
1) BASIC WIND SPEED: 85 MPH
2) SURFACE ROUGHNESS CATEGORY: B
3) EXPOSURE CATEGORY: B
4) IMPORTANCE FACTOR FOR WIND LOAD: 1.15
C. SEISMIC LOAD: REFER TO CBC SECTION 1613
1) SITE CLASS: D
2) SEISMIC DESIGN CATEGORY: D
3) MAPPED MCE SPECTRAL RESPONSE ACCELERATION
A) $S_s = 1.5g$
B) $S_1 = 0.604g$
4) SITE COEFFICIENT
A) $F_a = 1.0$
B) $F_v = 1.5$
5) IMPORTANCE FACTOR: 1.5
6) NON STRUCTURAL COMPONENT SEISMIC COEFFICIENTS
A) $a_p = 2.5$
B) $R_p = 2.5$

- D. LOAD COMBINATIONS: LRFD
- 1.4D
 - 1.2D + 1.6W + L
 - 1.2D + 1.0E + L
 - 0.9D + 1.6W
 - 0.9D + 1.0E

- E. LOAD COMBINATIONS: ASD
- D
 - D + W
 - D + 0.7E
 - 0.6D + W
 - 0.6D + 0.7E

- THE SIGN WEIGHT EXCLUDING THE SUPPORT FIXTURES SHALL BE LIMITED TO 65 LBS. (PER SPECIFIC SIGN)
- ALL STEEL MEMBERS SHALL BE GALVANIZED AND TRI-COAT PAINTED. (SEE SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS FOR COATING OF STEEL EXPOSED TO VIEW)
- ALL SUPPORT PIPES SHALL CONFORM TO ASTM A53 Gr B.
- ALL CONCRETE ANCHORS SHALL CONFORM TO ASTM F1554 Gr 36 AND ACI 318-05 AND ACI 355.02
- ALL NUTS SHALL CONFORM TO ASTM A563 Gr. A HEX HOT FORGED.
- ALL WASHERS SHALL CONFORM TO ASTM F844.
- THE INSTALLATION OF ALL ANCHORS SHALL FOLLOW MANUFACTURER'S INSTALLATION PROCEDURES.
- ALL FLEXIBLE FIXTURE JOINTS, AS WELL AS JUNCTION BOXES, SHALL BE HEAVY DUTY AND RATED AT 100 LBS CAPACITY MINIMUM.
- PROVIDE LOCTITE TO ALL BOLT & NUT CONNECTIONS, INCLUDING FLEXIBLE FIXTURE JOINTS, AND EYE BOLTS TO ANCHORS.

ABBREVIATIONS:

AB	ANCHOR BOLT
(E)	EXISTING
OH	OVERHEAD
PL	PLATE
STD	STANDARD
TYP	TYPICAL
VIF	VERIFY IN FIELD
W/	WITH

DESIGNED:	
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DATE:	MARCH 2012

REGIONAL TRANSIT WAYFINDING GUIDELINES & STANDARDS



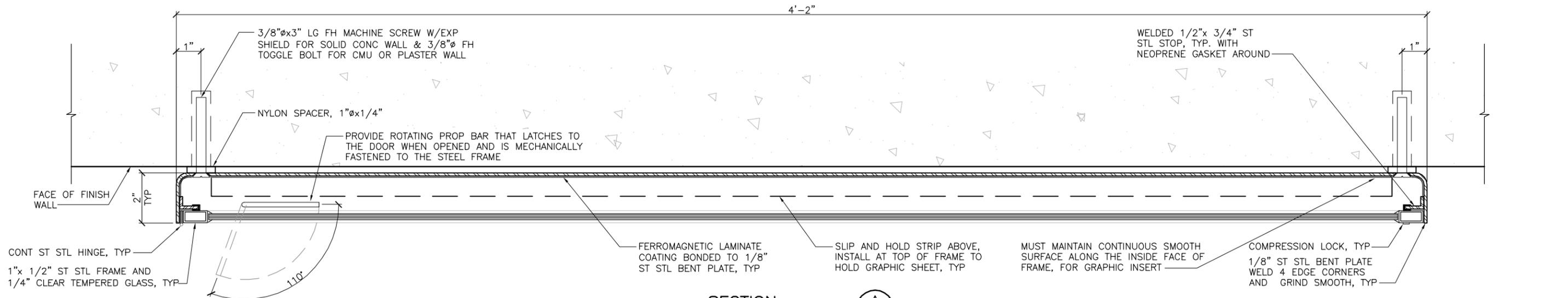
STANDARD DRAWINGS

OVERHEAD SIGN SUPPORT DETAILS

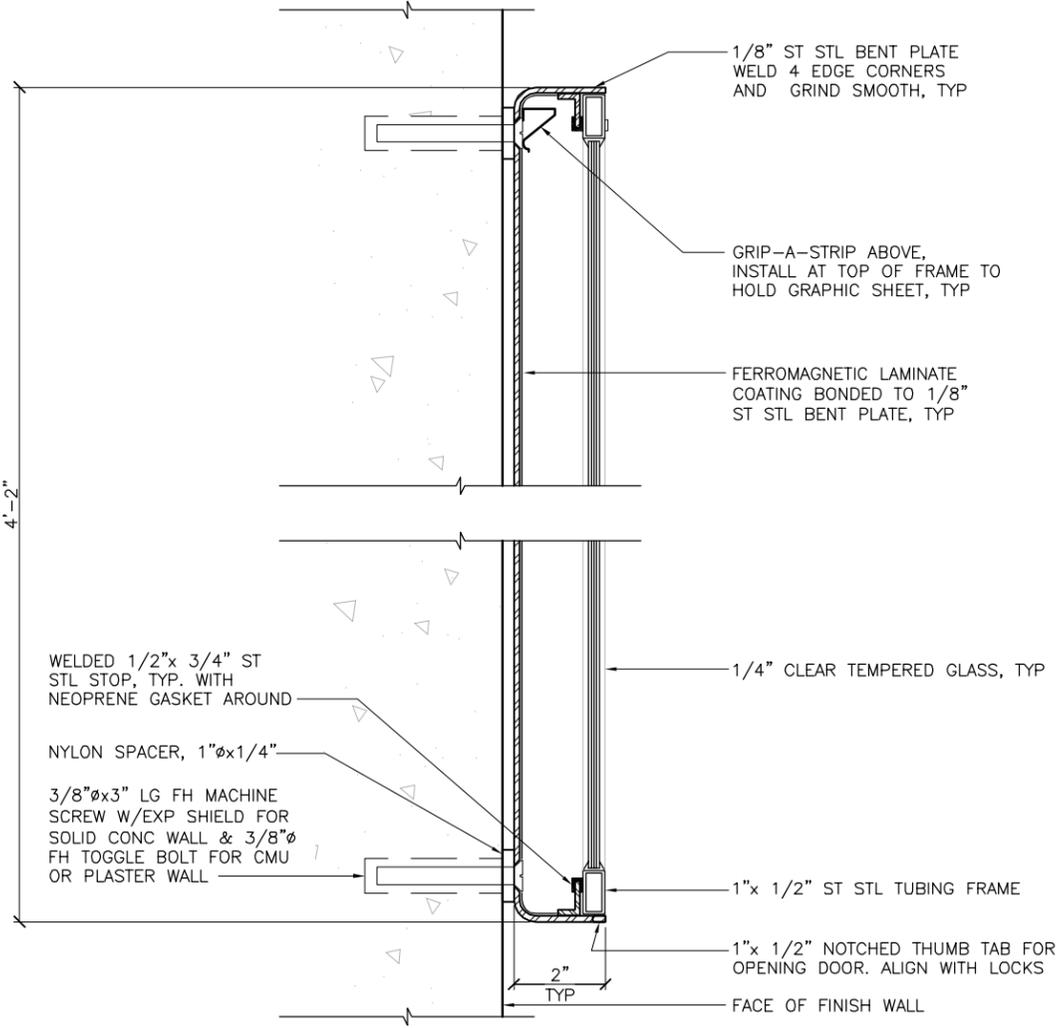
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CONTRACT NO.	REV.
CONTRACT SHEET NO.	PAGE NO.
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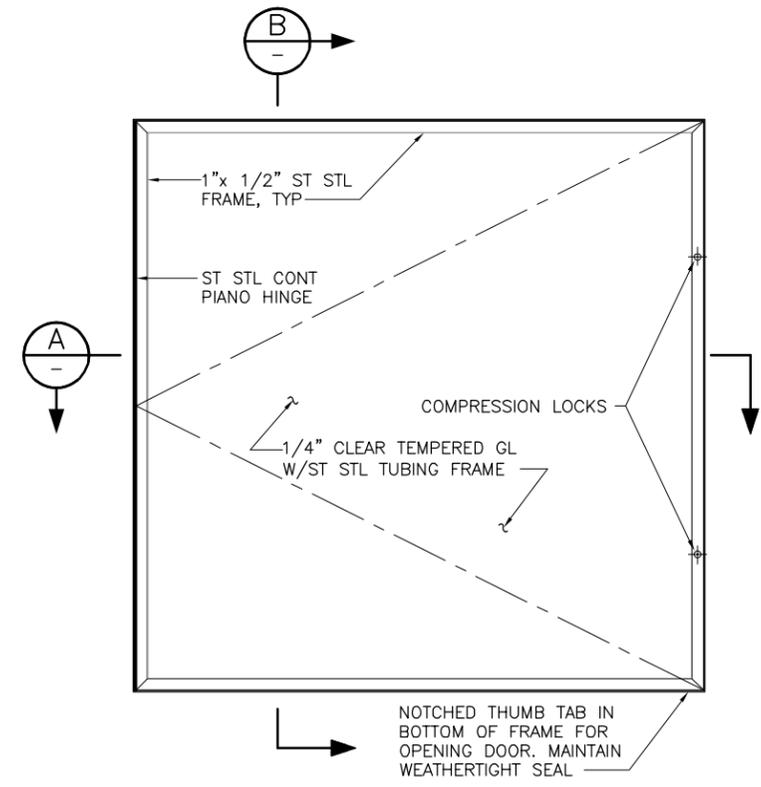
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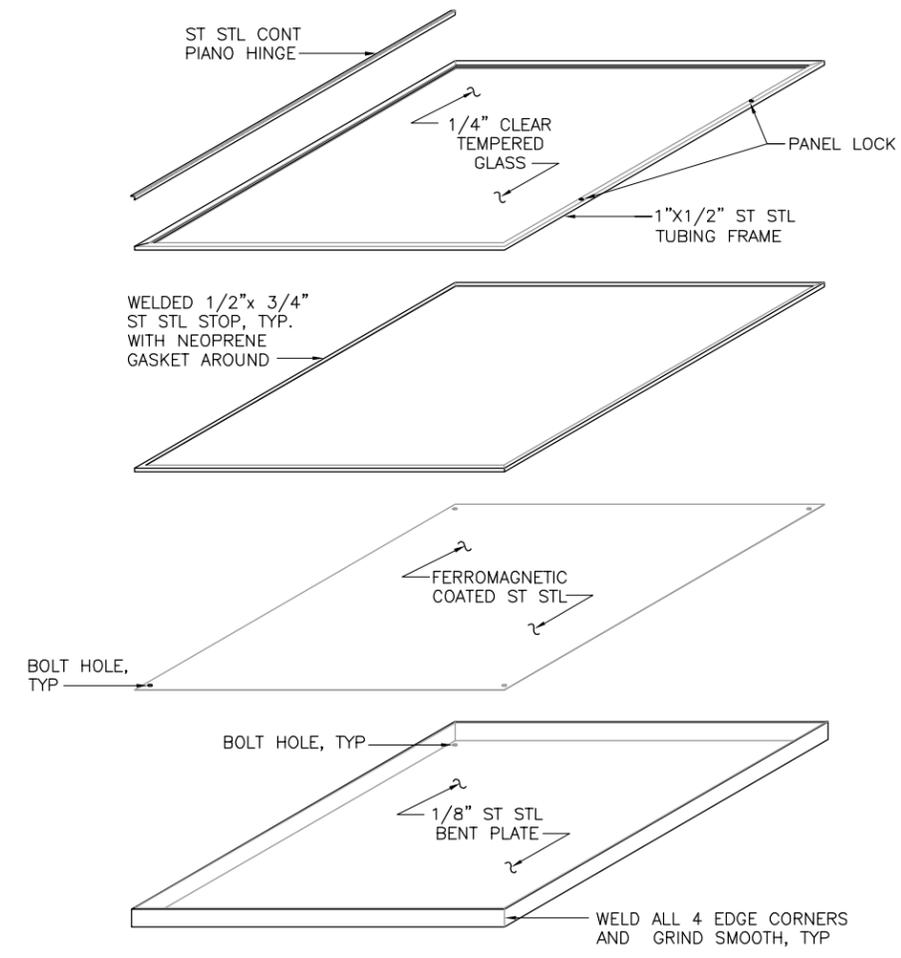
SECTION A
SCALE: HALF SIZE



SECTION B
SCALE: HALF SIZE



ELEVATION 1
SCALE: 1 1/2" = 1'-0"



ASSEMBLY DIAGRAM - ISOMETRIC 2
SCALE: NO SCALE

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REGIONAL TRANSIT WAYFINDING GUIDELINES & STANDARDS

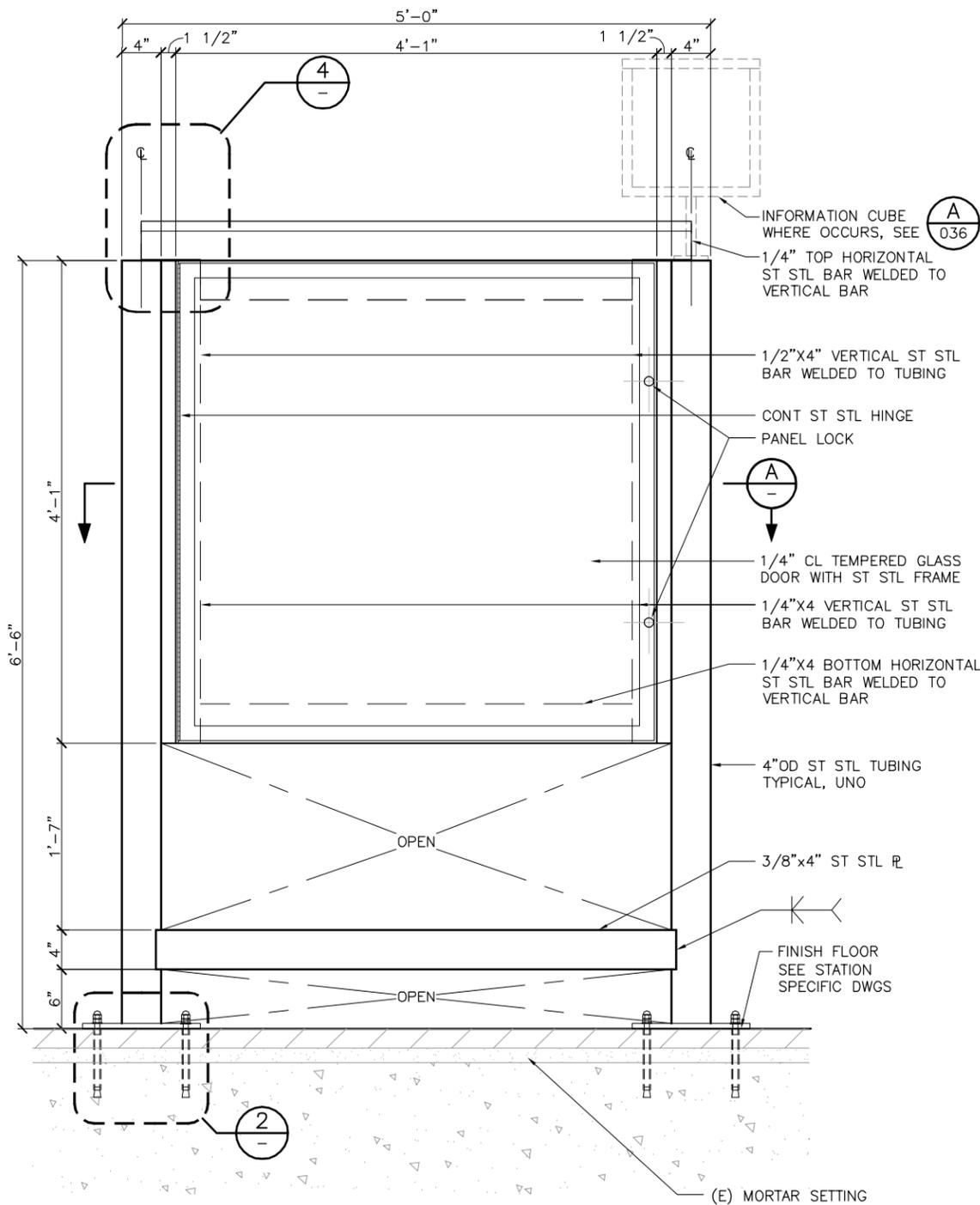


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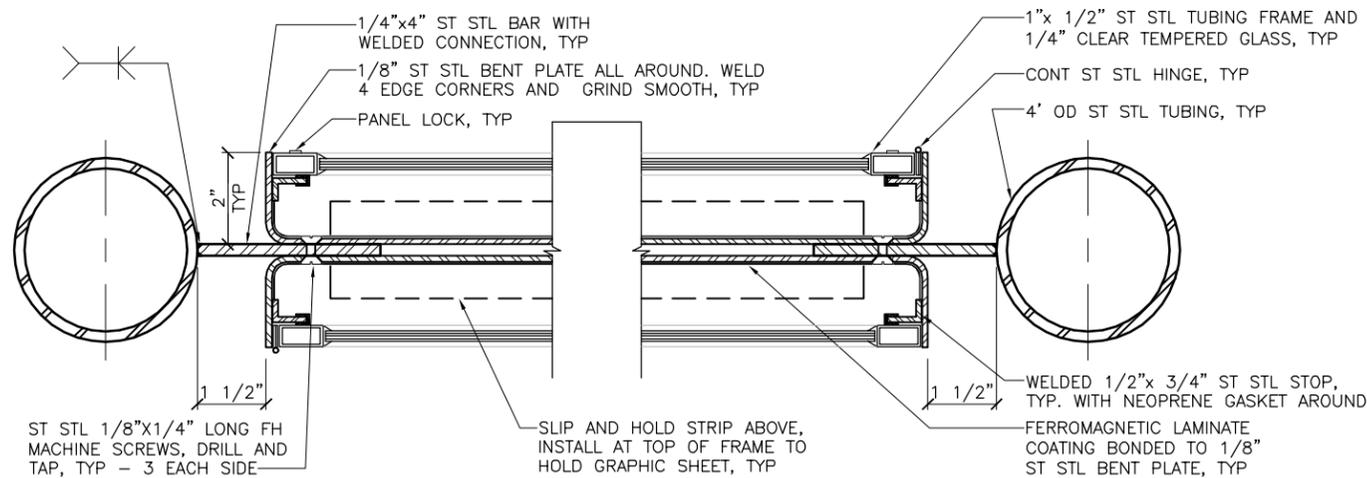
STANDARD DRAWINGS

SURFACE MOUNT - MAPS/SCHEDULE CASE
ELEVATION, SECTIONS AND ISOMETRIC

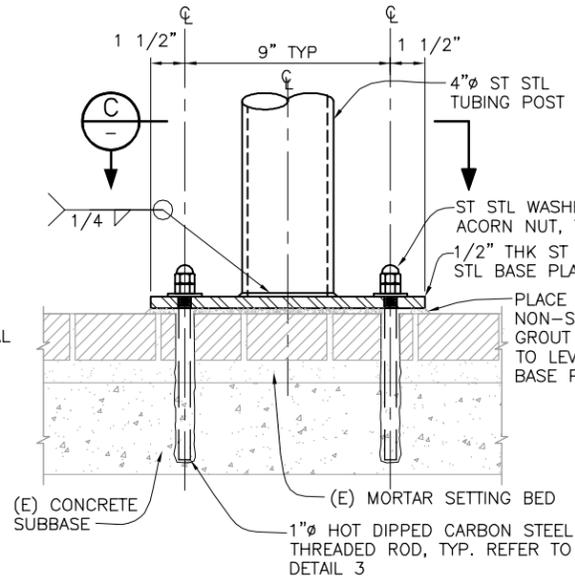
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CONTRACT NO.	REV.
CONTRACT SHEET NO.	PAGE NO.
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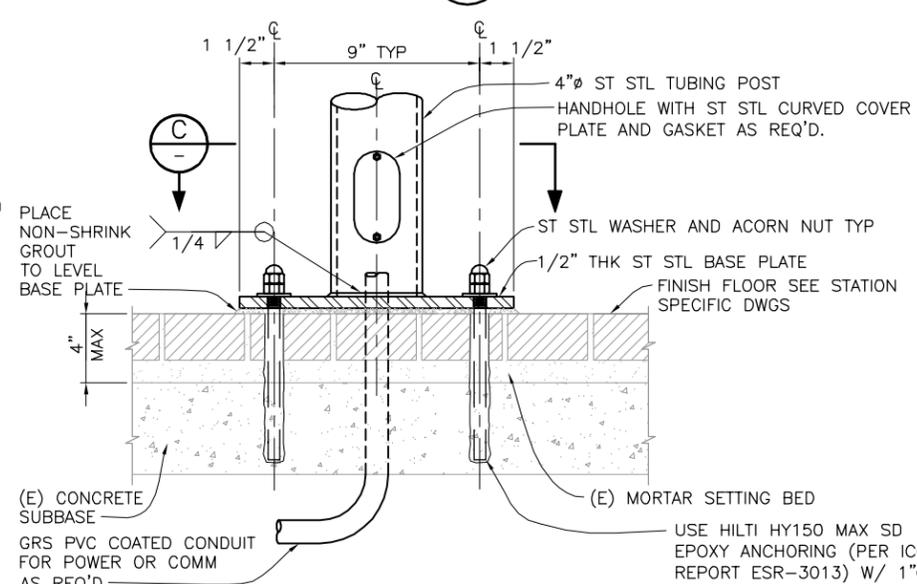
ELEVATION
SCALE: 1 1/2" = 1'-0" **1**



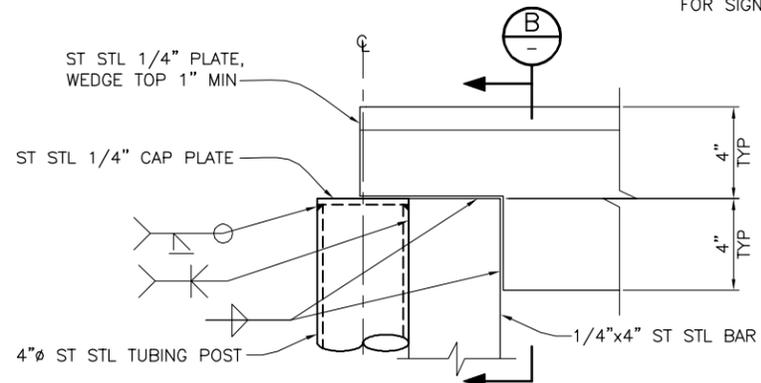
SECTION
SCALE: HALF SIZE **A**



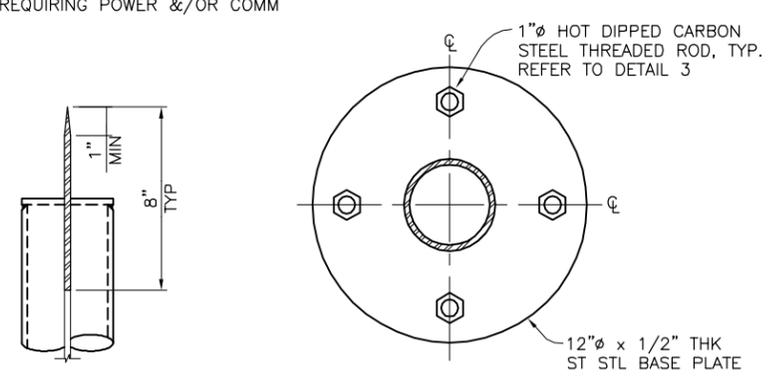
ANCHOR DETAIL
SCALE: 3" = 1'-0" **2**



ANCHOR DETAIL
SCALE: 3" = 1'-0" **3**
FOR SIGNAGE REQUIRING POWER &/OR COMM



CAP DETAIL
SCALE: 3" = 1'-0" **4**



SECTION
SCALE: 3" = 1'-0" **B**

SECTION
SCALE: 3" = 1'-0" **C**

DESIGNED:	
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DATE:	MARCH 2012

REGIONAL TRANSIT WAYFINDING GUIDELINES & STANDARDS

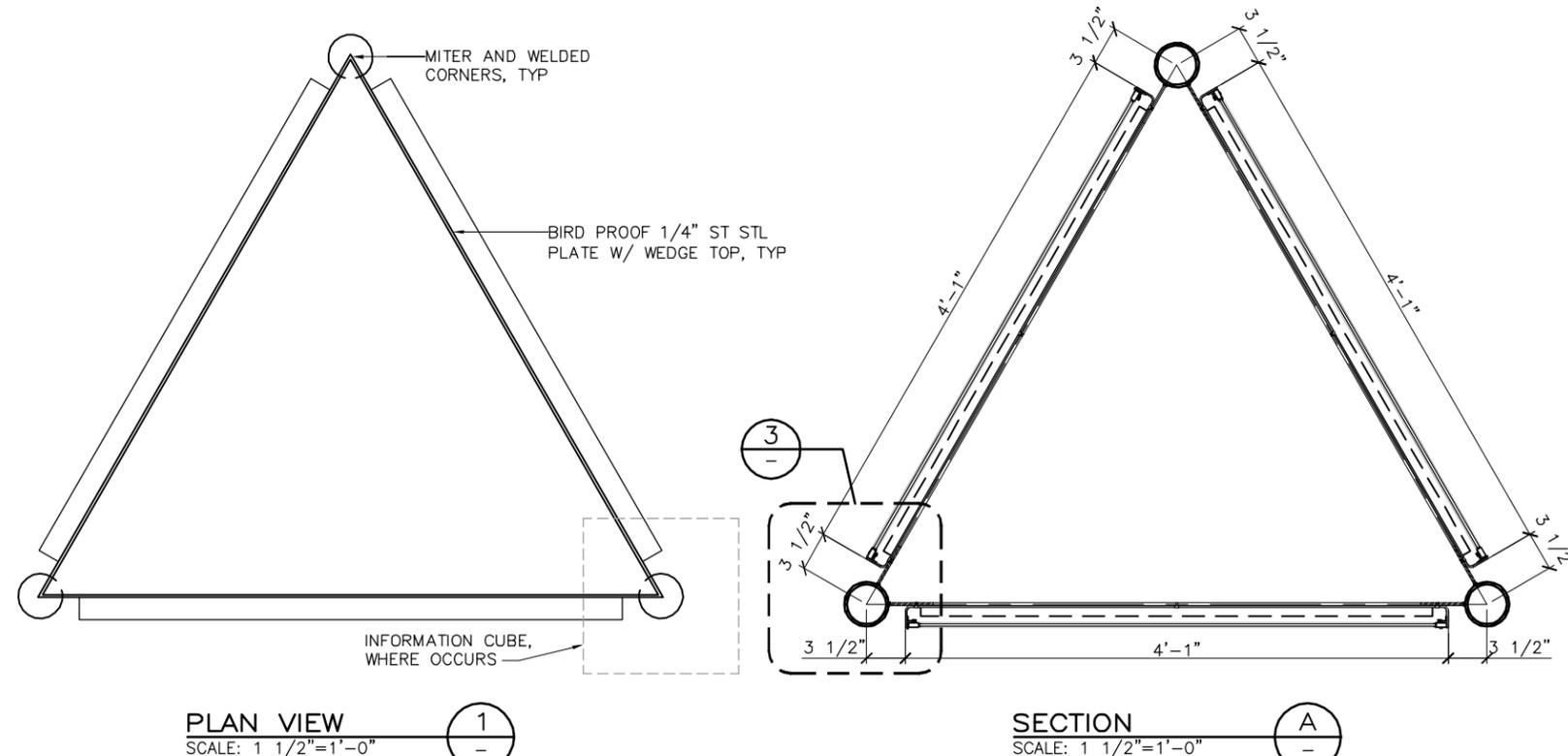
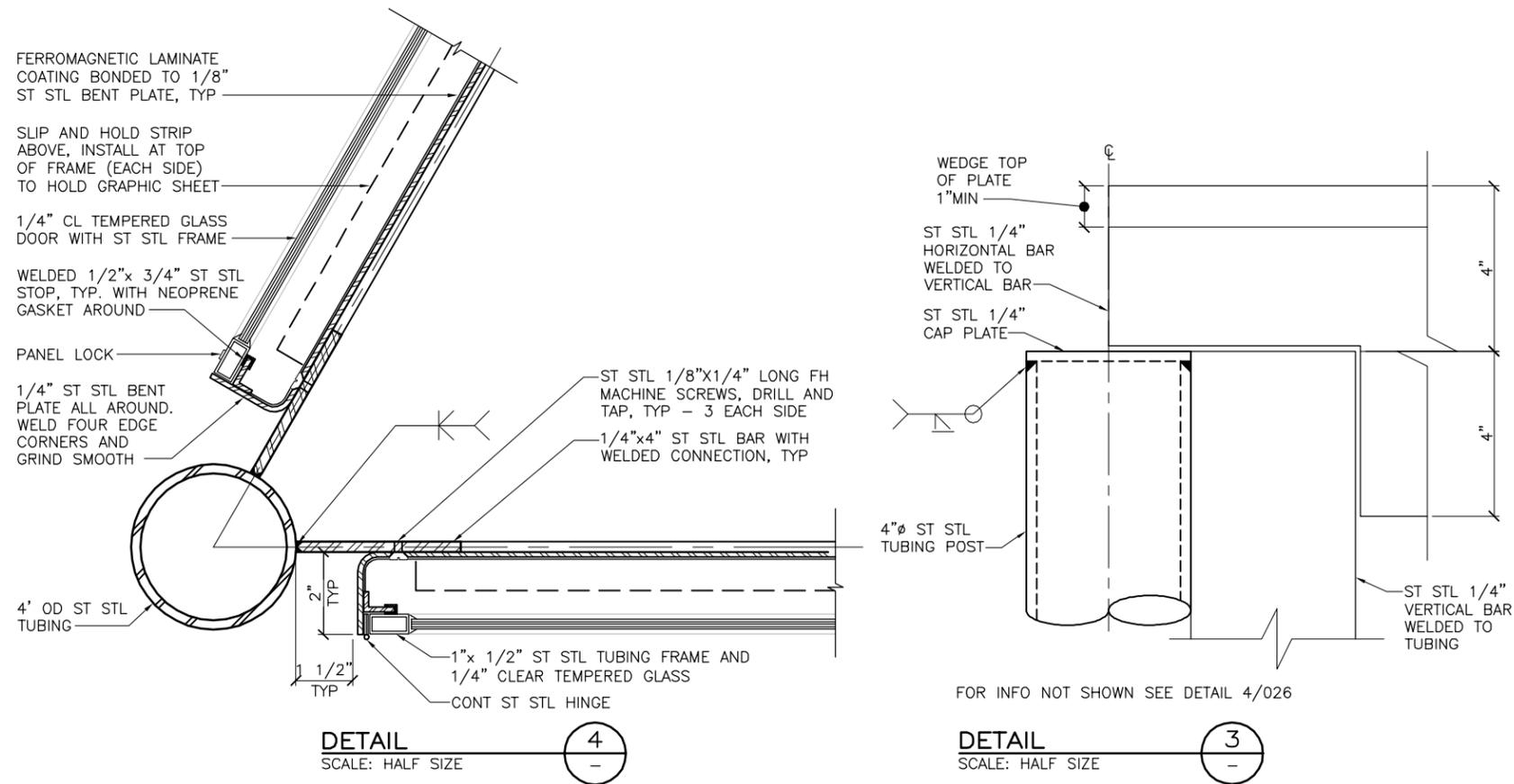
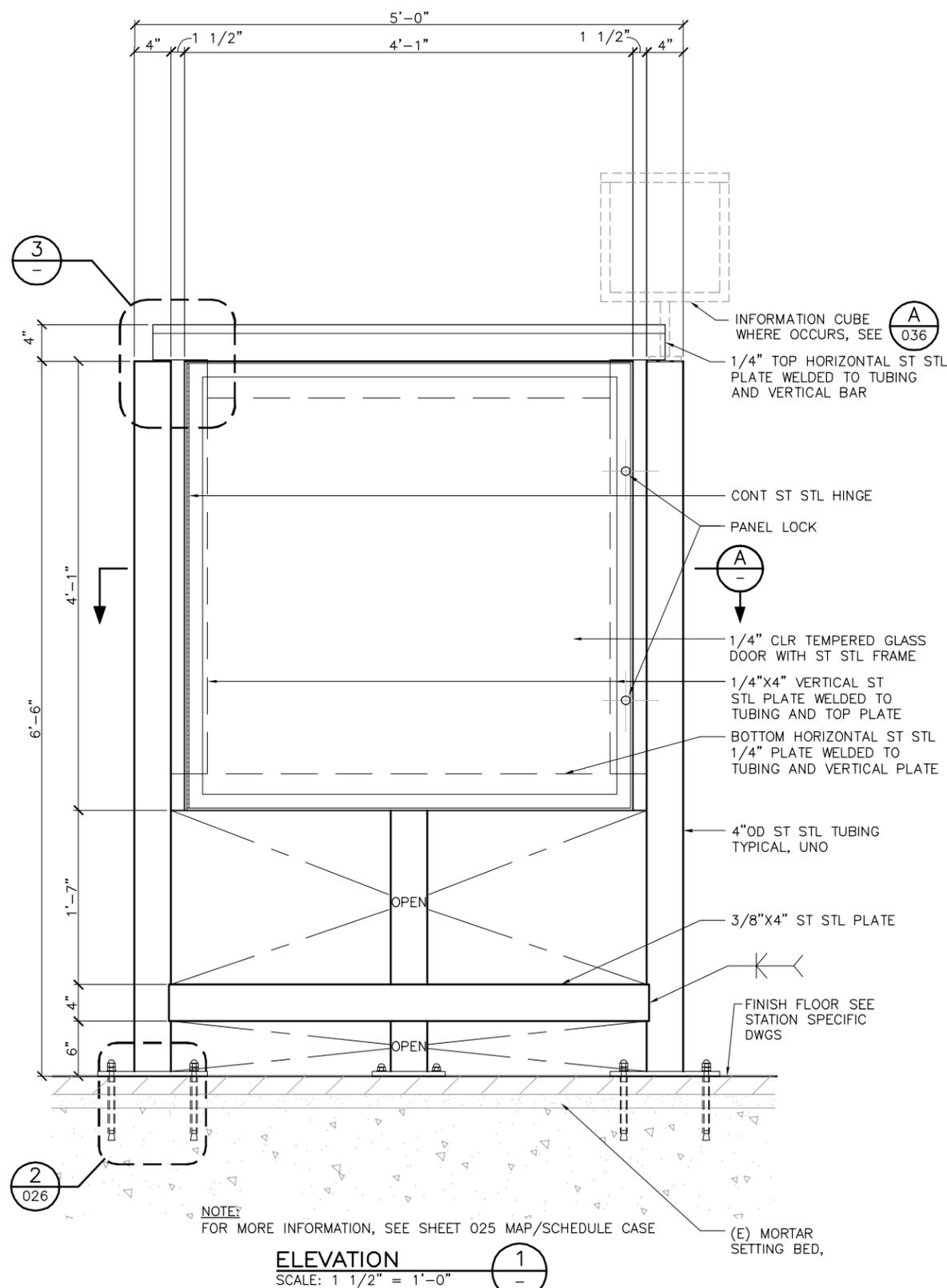


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STANDARD DRAWINGS

TWO SIDED-FREE STANDING MAPS/SCHEDULE CASE FRAME
ELEVATION, SECTIONS AND DETAILS

CADD FILENAME	
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CONTRACT SHEET NO.	PAGE NO.
	026



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REGIONAL TRANSIT WAYFINDING GUIDELINES & STANDARDS

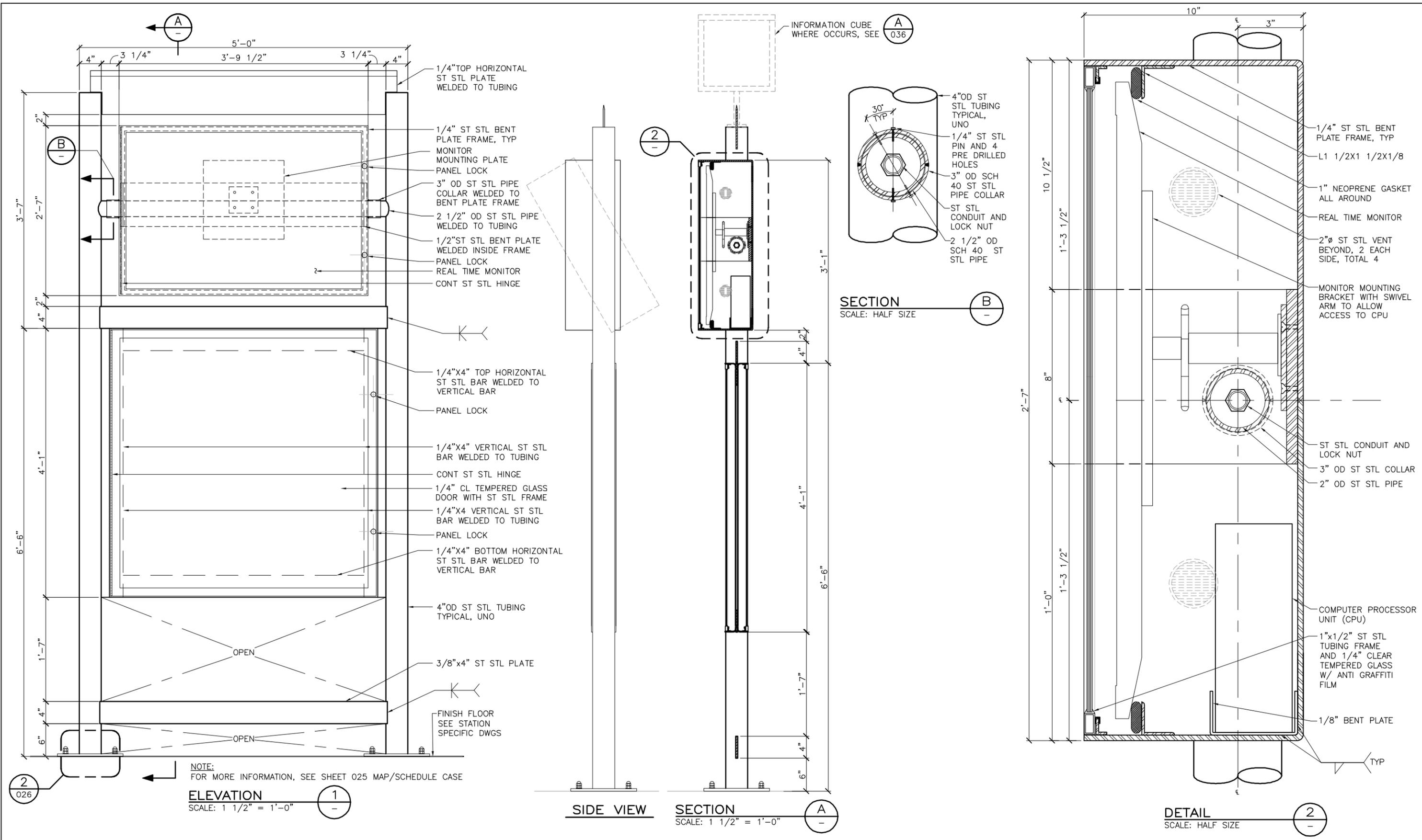


METROPOLITAN
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STANDARD DRAWINGS

THREE SIDED - FREE STANDING MAPS/SCHEDULE CASE FRAME
ELEVATION, PLAN VIEW, SECTIONS AND DETAILS

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CONTRACT SHEET NO.	PAGE NO.
	027



REV.	DATE	BY	SUB	APP.	DESCRIPTION

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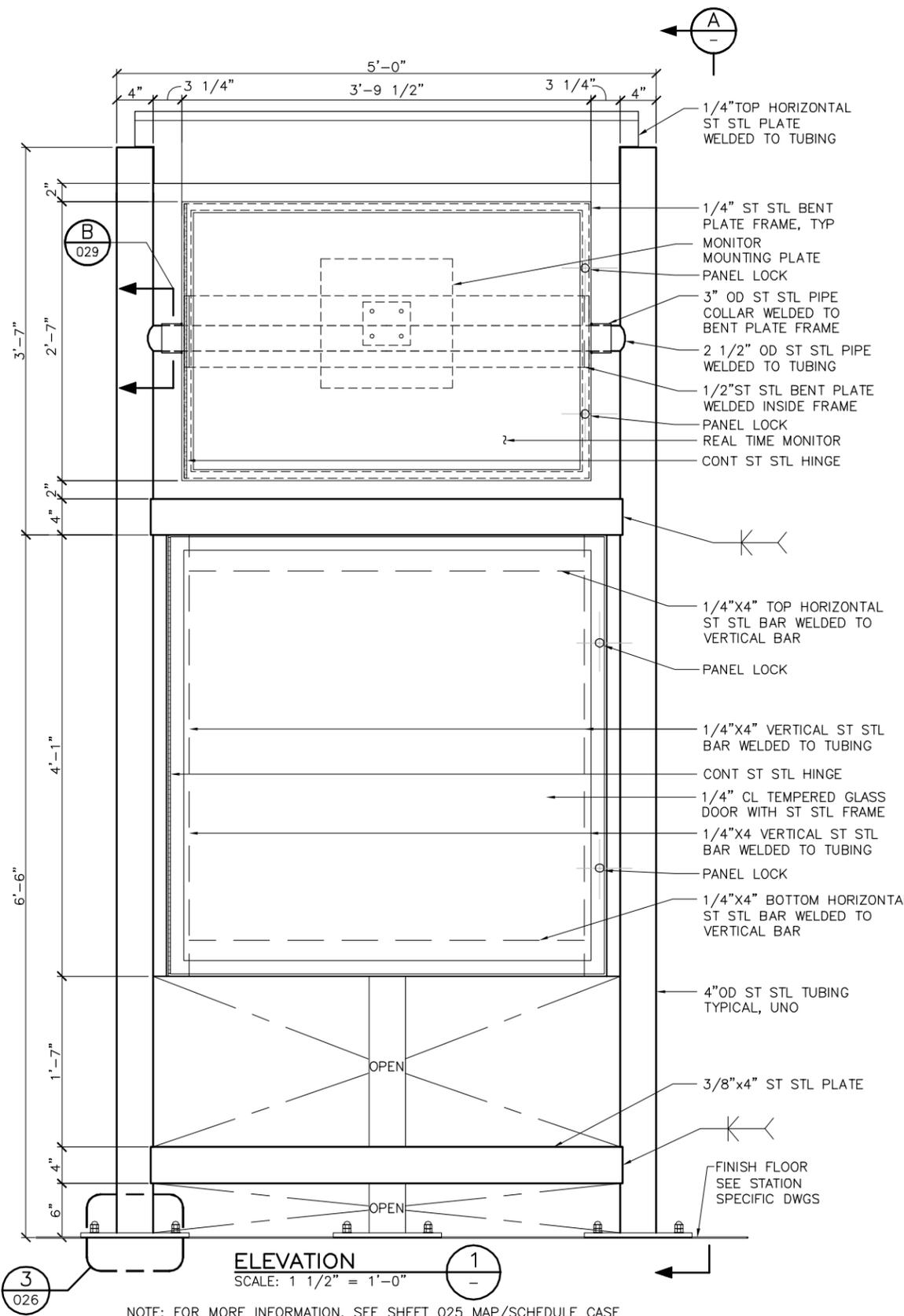
REGIONAL TRANSIT WAYFINDING GUIDELINES & STANDARDS


METROPOLITAN TRANSPORTATION COMMISSION

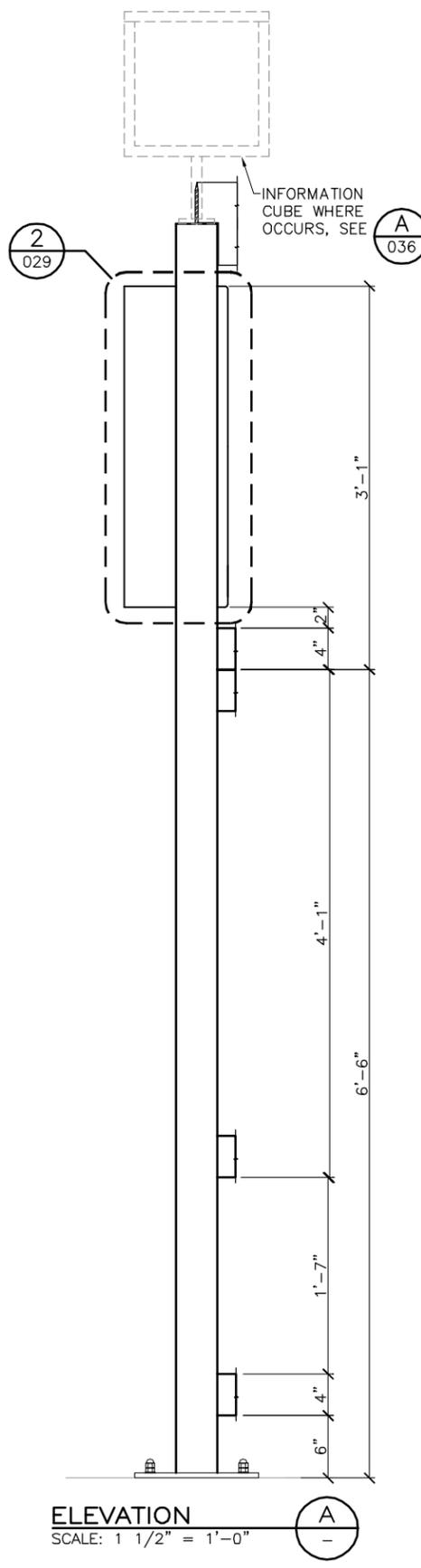
STANDARD DRAWINGS

TWO SIDED FREE STANDING
MAPS/SCHEDULE AND REAL-TIME CASE FRAME
ELEVATION, SECTION AND DETAILS

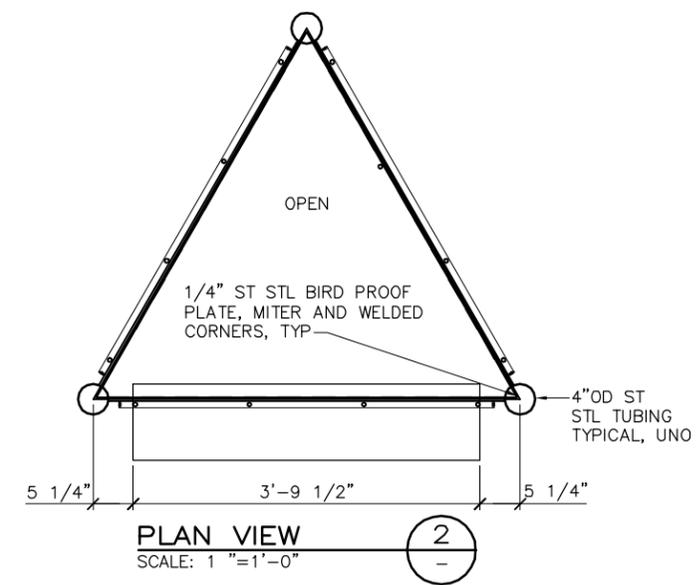
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CONTRACT SHEET NO.	PAGE NO.
	029



ELEVATION
SCALE: 1 1/2" = 1'-0"



ELEVATION
SCALE: 1 1/2" = 1'-0"



PLAN VIEW
SCALE: 1" = 1'-0"

NOTE: FOR MORE INFORMATION, SEE SHEET 025 MAP/SCHEDULE CASE

REV.	DATE	BY	SUB	APP.	DESCRIPTION

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DATE:	MARCH 2012

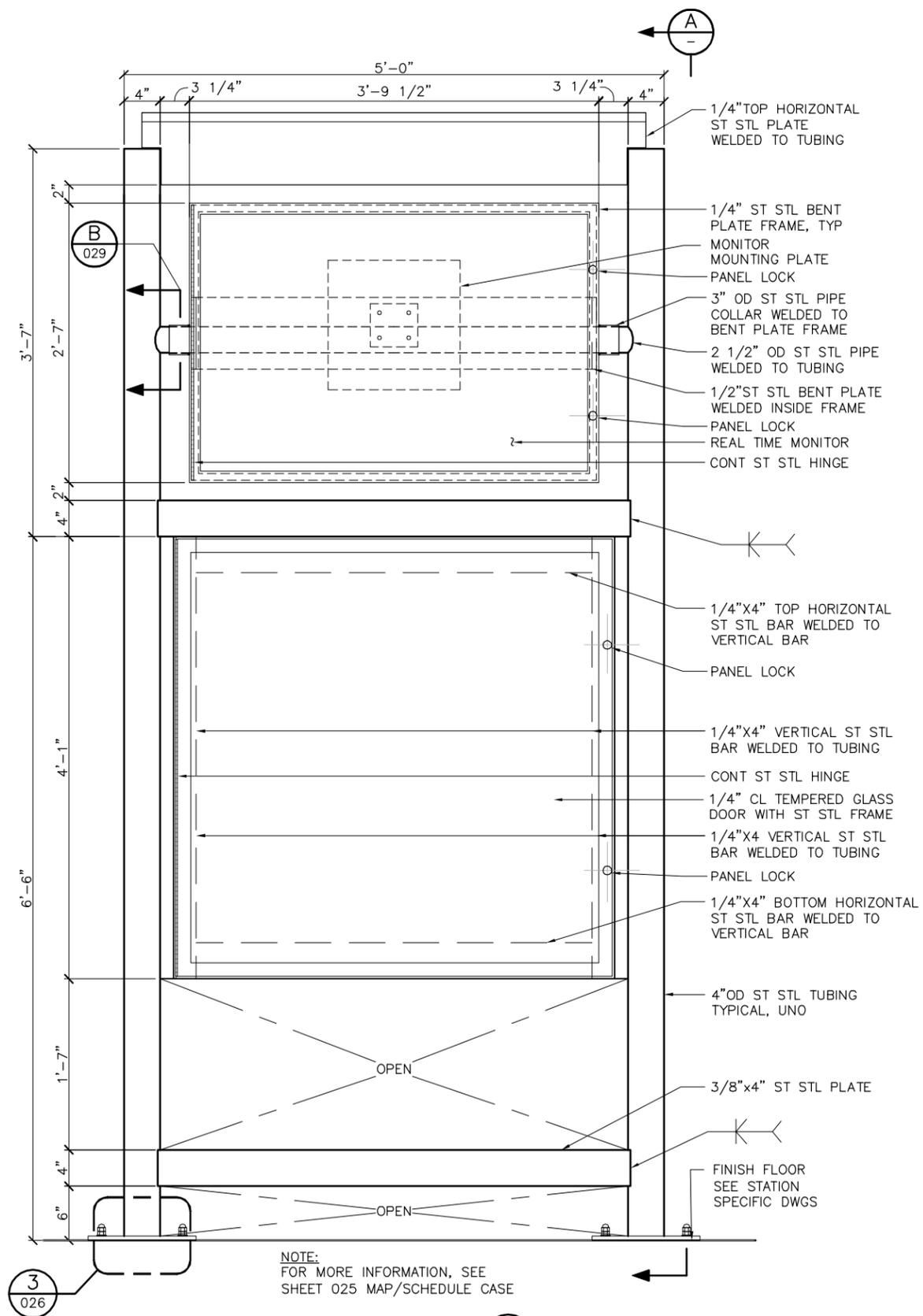
REGIONAL TRANSIT WAYFINDING GUIDELINES & STANDARDS

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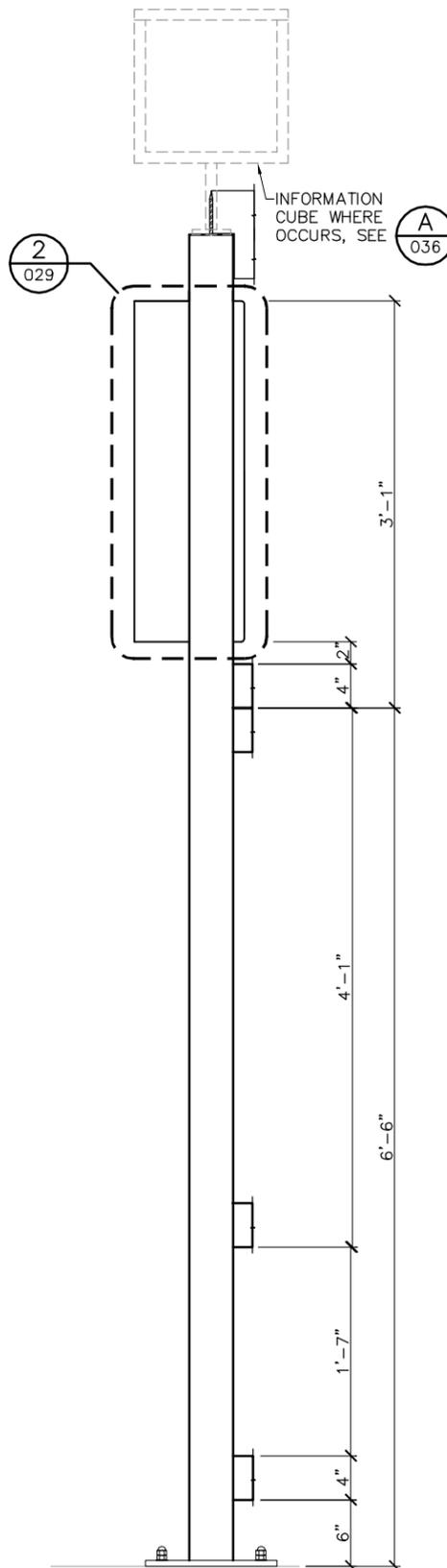
STANDARD DRAWINGS

THREE SIDED FREE STANDING
MAPS/SCHEDULE AND REAL-TIME CASE FRAME
ELEVATIONS AND PLAN VIEW

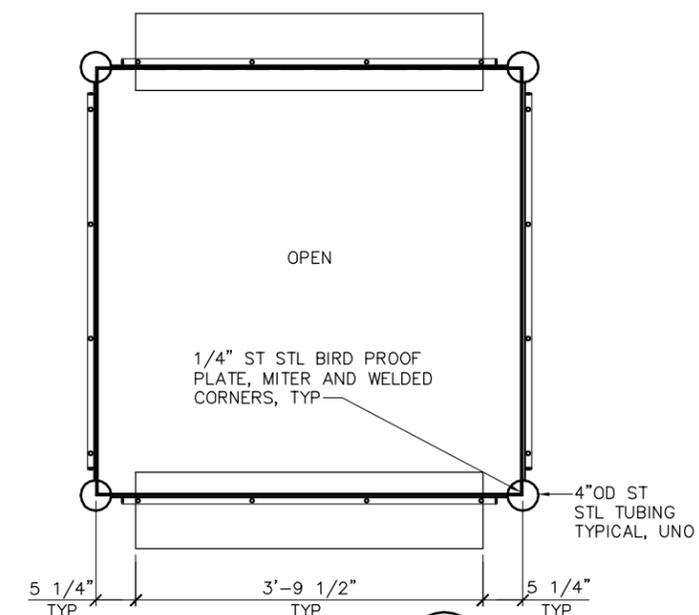
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CONTRACT NO.	
CONTRACT SHEET NO.	PAGE NO.
	030



ELEVATION
SCALE: 1 1/2" = 1'-0"



ELEVATION
SCALE: 1 1/2" = 1'-0"



PLAN VIEW
SCALE: 1" = 1'-0"

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DATE:	MARCH 2012

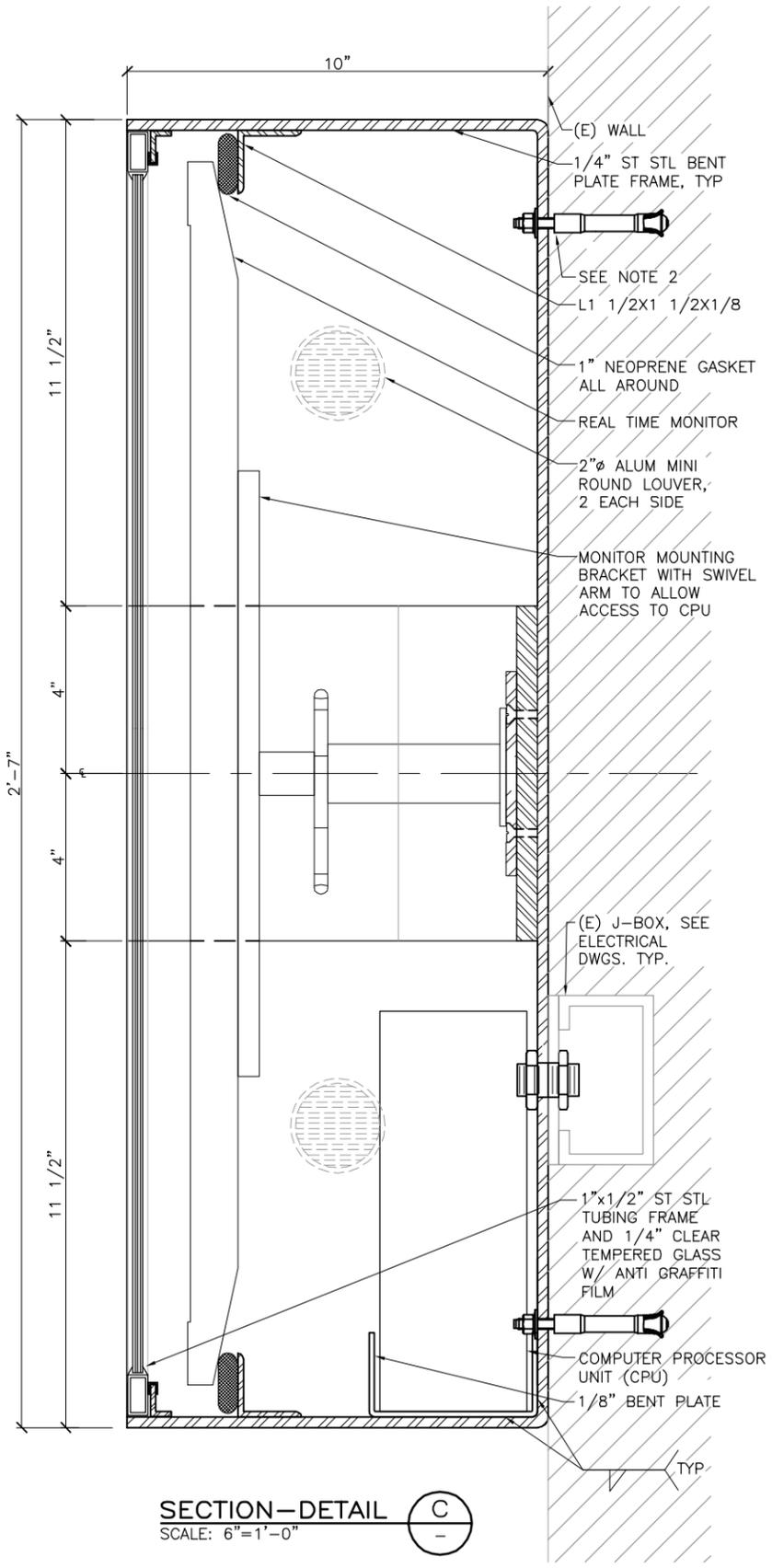
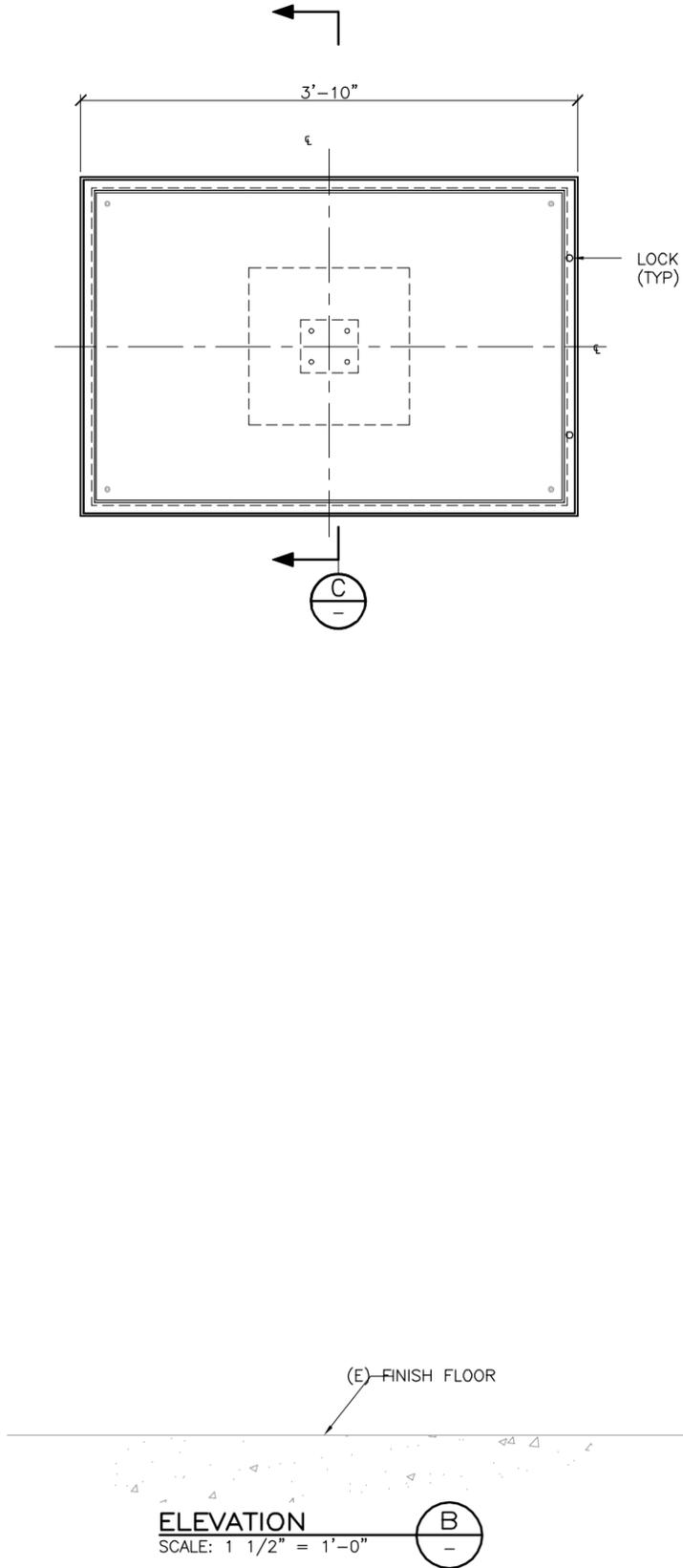
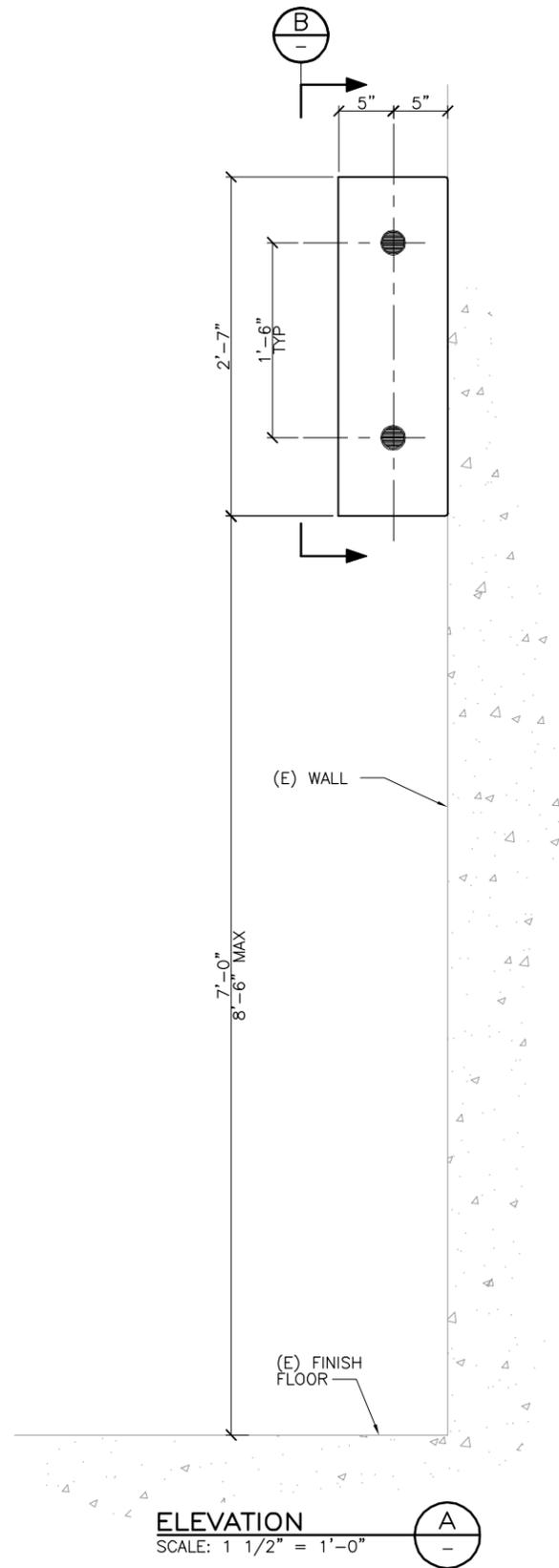
REGIONAL TRANSIT WAYFINDING GUIDELINES & STANDARDS

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STANDARD DRAWINGS

FOUR SIDED FREE STANDING MAPS/SCHEDULE AND REAL-TIME CASE FRAME ELEVATIONS AND PLAN VIEW

CADD FILENAME	
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CONTRACT NO.	REV.
CONTRACT SHEET NO.	PAGE NO.
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- NOTES:**
- FOR FINISHES OF CABINET, ANGLES, AND FASTENERS, SEE SPECIFICATIONS.
 - USE 1/2"Ø HILTI KBTZ OR SIMPSON STRONG-BOLT EXPANSION ANCHOR OR EQUAL FOR CONC. WALL & USE 1/2"Ø HILTI KB3 OR SIMPSON WEDGE - ALL EXPANSION ANCHOR OR EQUAL FOR MASONRY WALL

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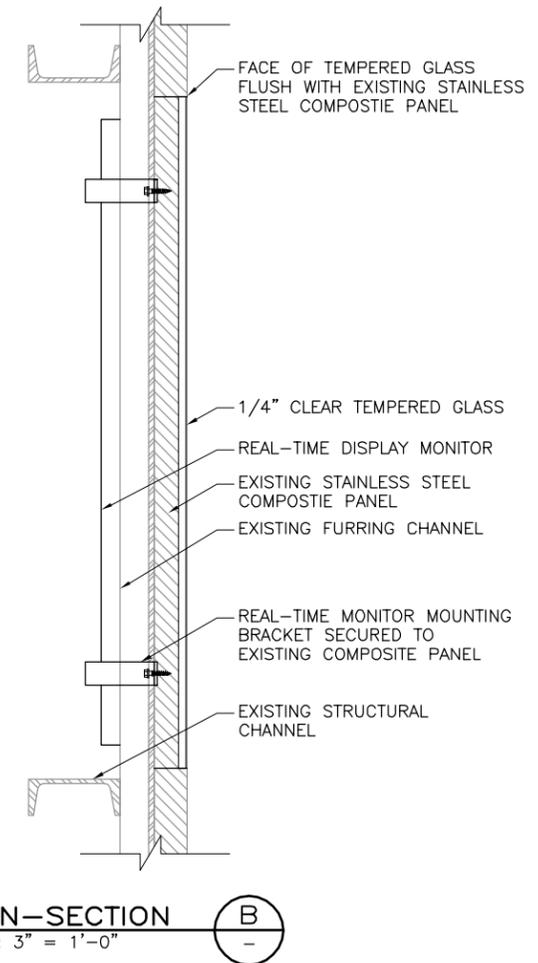
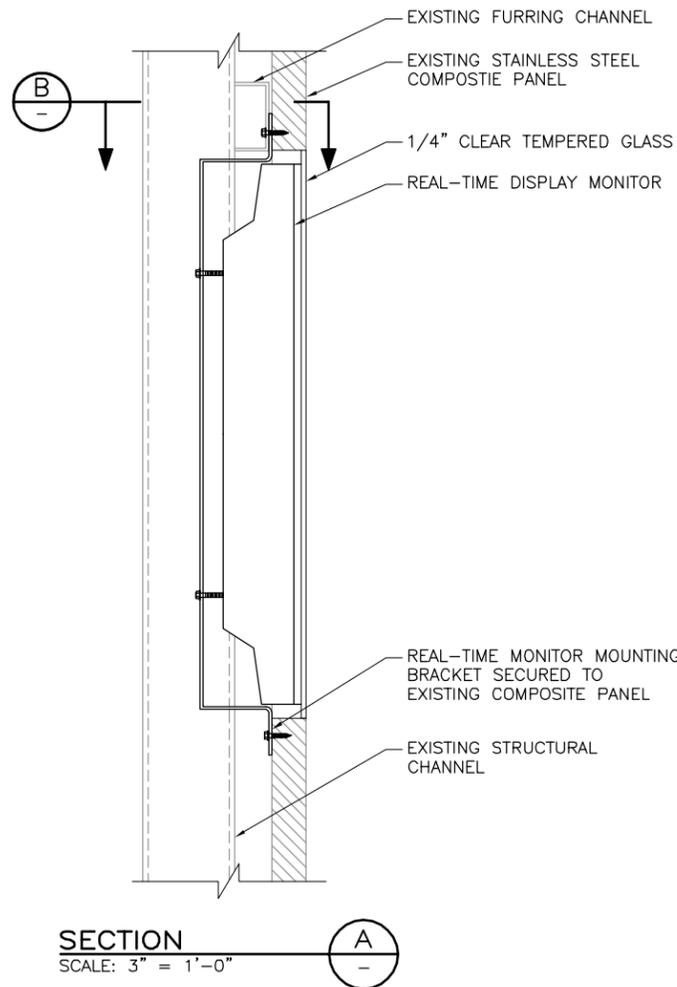
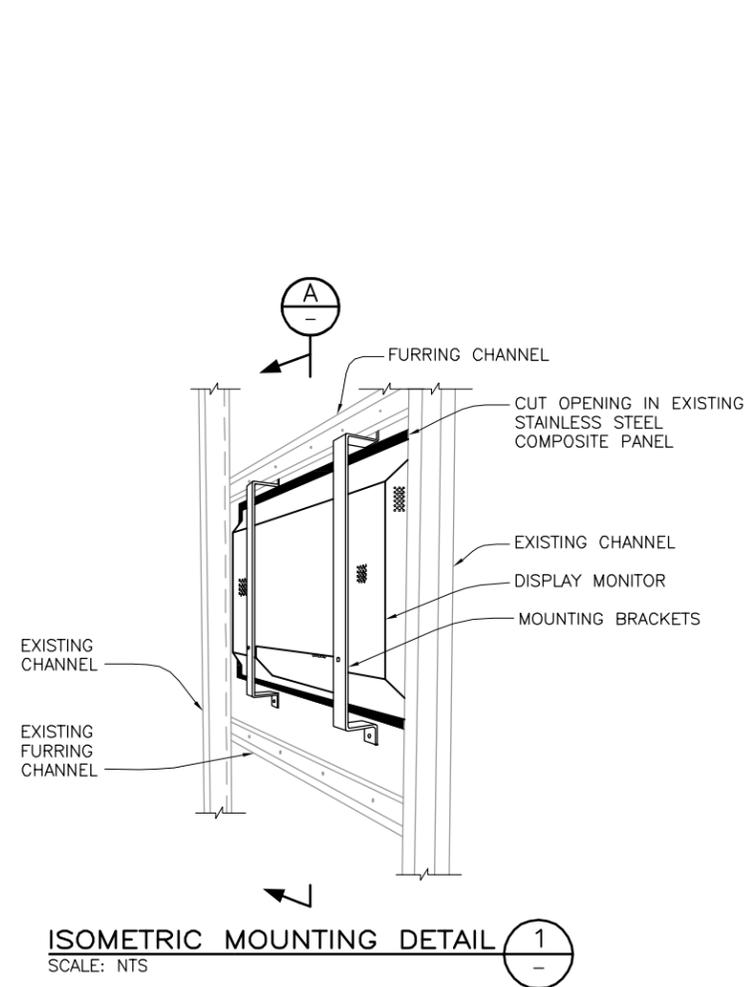
REGIONAL TRANSIT WAYFINDING GUIDELINES & STANDARDS


**METROPOLITAN
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COMMISSION**

STANDARD DRAWINGS

WALL MOUNTED REAL-TIME DISPLAY
ELEVATIONS AND SECTION DETAIL

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CONTRACT SHEET NO.	PAGE NO.
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					RELEASE 1.0d MARCH 2012

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APPROVED:	
DATE:	MARCH 2012

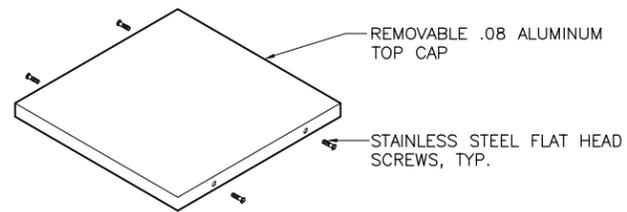
REGIONAL TRANSIT WAYFINDING GUIDELINES & STANDARDS

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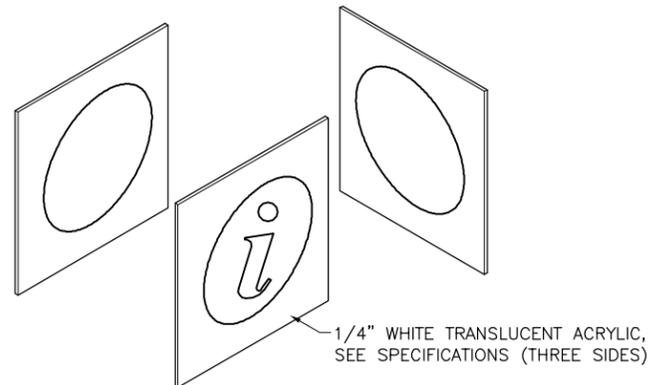
STANDARD DRAWINGS

RECESSED REAL-TIME DISPLAY
SECTIONS AND ISOMETRIC DETAIL

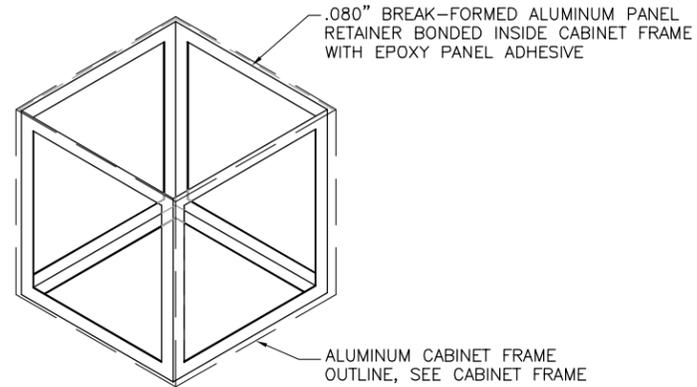
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CONTRACT NO.	REV.
CONTRACT SHEET NO.	PAGE NO.
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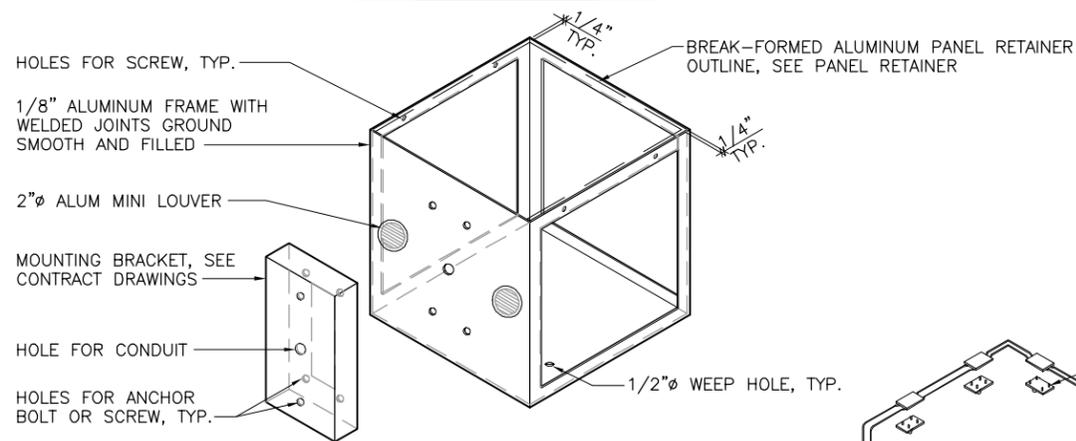
ALUMINUM TOP CAP



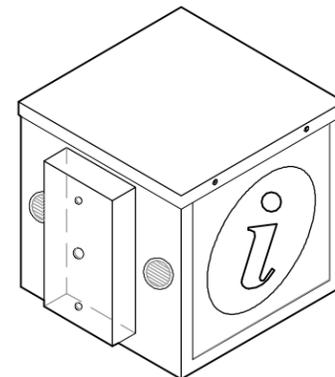
ALUMINUM CABINET



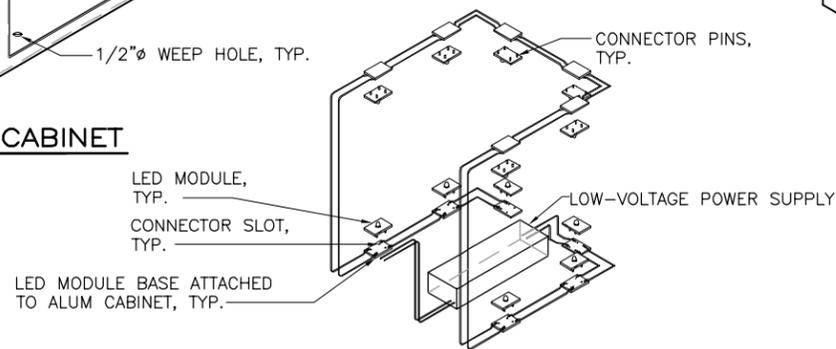
ALUMINUM PANEL RETAINER



ALUMINUM CABINET



CUBE ASSEMBLY

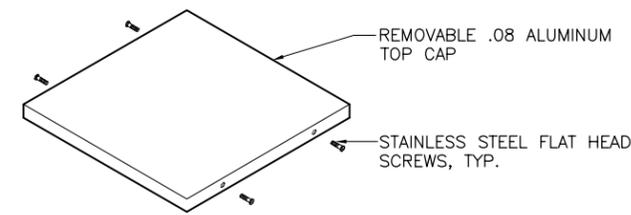


LED MODULE ASSEMBLY

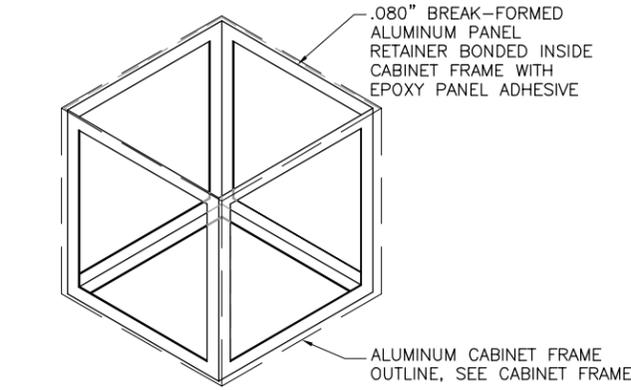
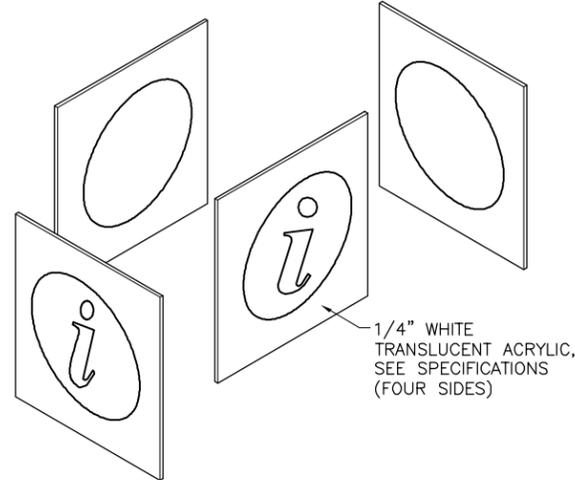
GENERAL NOTES:

1. THE LED SHALL BE RATED 100 LUMEN PER WATT, MOUNTED ON AND DRIVEN BY A LIGHT ENGINE MODULE CAPABLE OF DELIVERING 195 LUMENS AT 1.0A IN A CONSTANT-CURRENT CONFIGURATION. THE LED SHALL BE PROVIDED WITH GOLD-PLATED PINS TO BE INSERTED INTO SOCKETS EMBEDDED IN LIGHT ENGINE MODULE. ALTERNATELY, THE LED AND THE LIGHT ENGINE MODULE MAY BE INTEGRATED ON A PRINTED CIRCUIT BOARD AS SHOWN ON THE DRAWING. THE INTEGRATED MODULE SHALL BE PROVIDED WITH GOLD-PLATED PINS TO BE INSERTED INTO SOCKETS EMBEDDED IN AN INTERFACE BASE MODULE. THE BASE MODULE SHALL BE PROVIDED WITH SOLDERING POINTS FOR EXTERNAL COPPER WIRES.
2. IN EITHER CONFIGURATION (SEE ABOVE), THE PINS OF THE LED OR THE INTEGRATED MODULE SHALL BE RIGID FOR THE LED OR THE MODULE TO BE EASILY EXTRACTED WITHOUT INCURRING DAMAGE TO THE PINS OR DEGRADING THE ELECTRICAL CONTACT. THE INTEGRATED MODULE SHALL PLUG INTO SPACERS ON THE BASE MODULE FOR PHYSICAL SUPPORT.
3. EACH CABINET PRIMARY ELECTRICAL LOAD IS 277VAC/2.0A.
4. FOR FINISHES OF CABINET AND MOUNTING BRACKET, SEE SPECIFICATIONS.

					DESIGNED:	REGIONAL TRANSIT WAYFINDING GUIDELINES & STANDARDS		STANDARD DRAWINGS		CADD FILENAME	
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					APPROVED:					REV.	
					DATE:					CONTRACT SHEET NO. PAGE NO.	
RELEASE 1.0d MARCH 2012					MARCH 2012					035	
REV.	DATE	BY	SUB	APP.	DESCRIPTION						

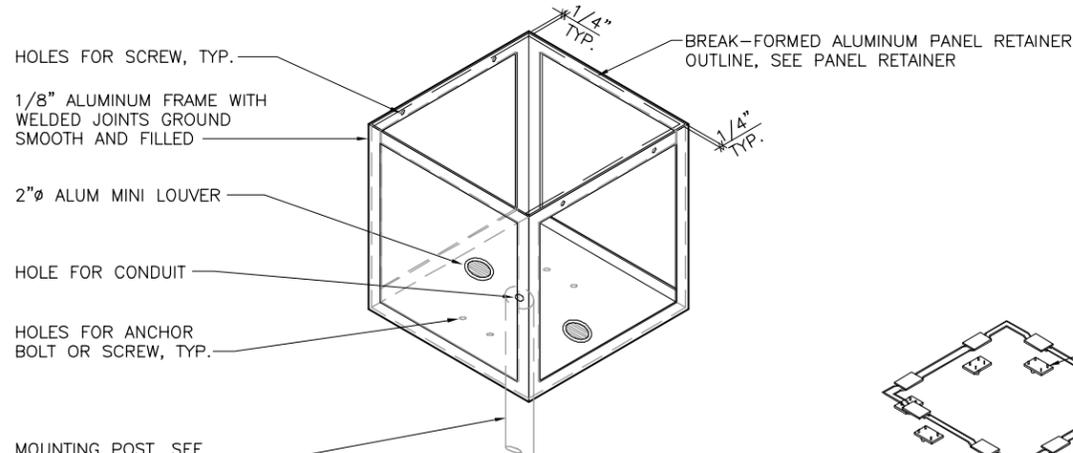


ALUMINUM TOP CAP

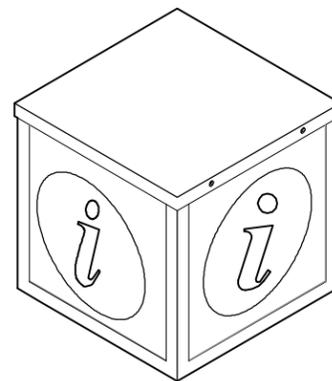


ALUMINUM PANEL RETAINER

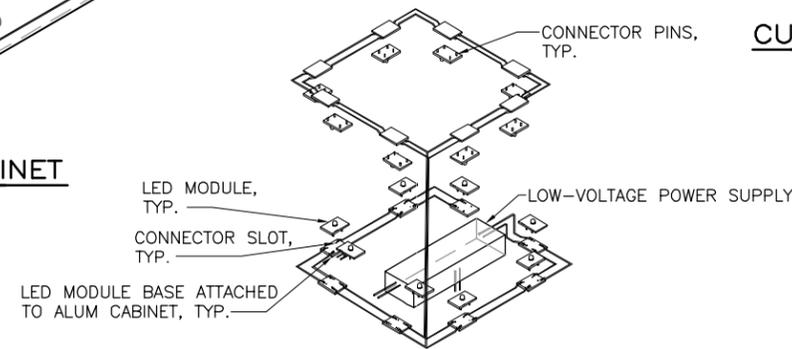
ALUMINUM CABINET



ALUMINUM CABINET



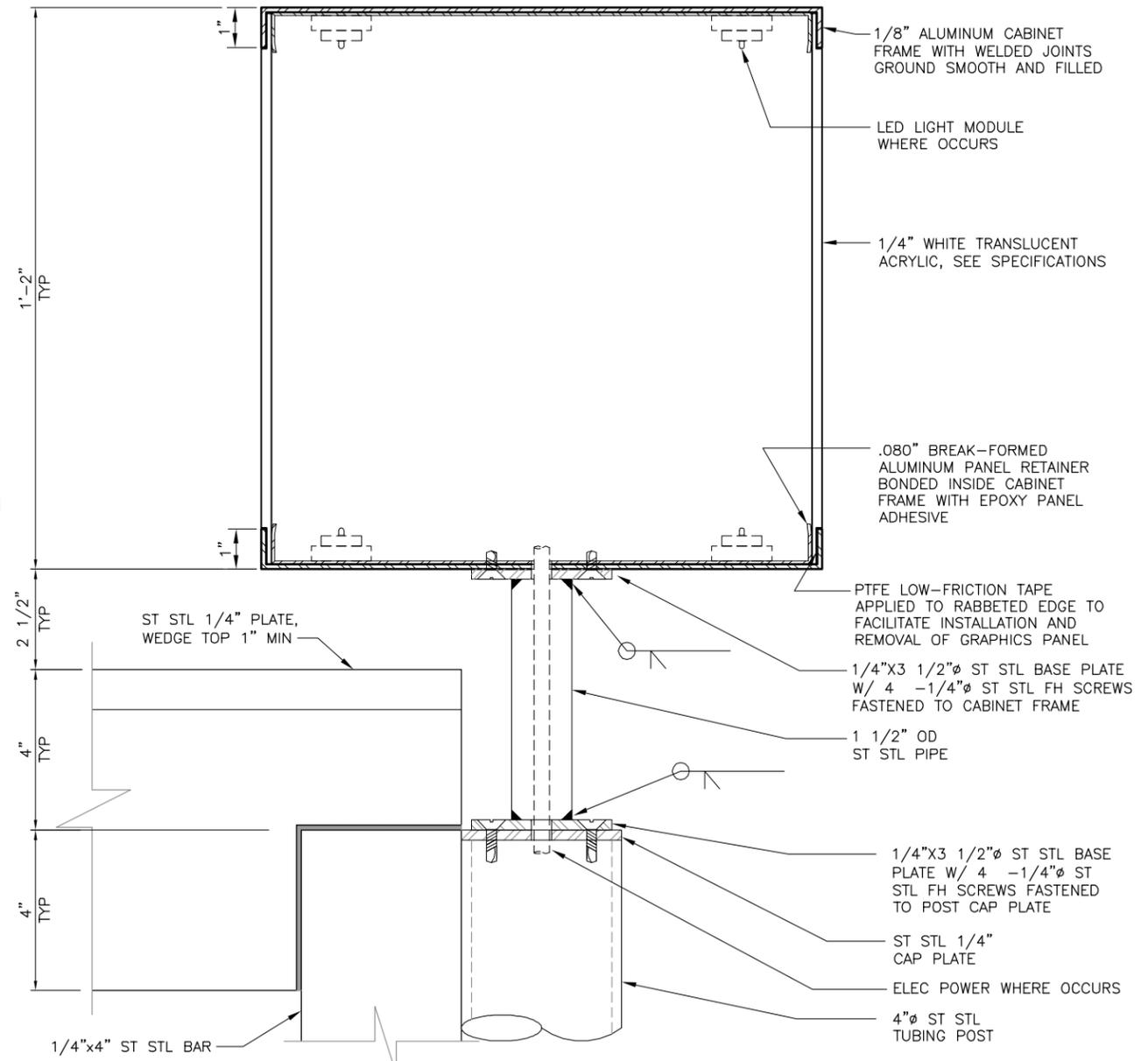
CUBE ASSEMBLY



LED MODULE ASSEMBLY

GENERAL NOTES:

1. THE LED SHALL BE RATED 100 LUMEN PER WATT, MOUNTED ON AND DRIVEN BY A LIGHT ENGINE MODULE CAPABLE OF DELIVERING 195 LUMENS AT 1.0A IN A CONSTANT-CURRENT CONFIGURATION. THE LED SHALL BE PROVIDED WITH GOLD-PLATED PINS TO BE INSERTED INTO SOCKETS EMBEDDED IN LIGHT ENGINE MODULE. ALTERNATELY, THE LED AND THE LIGHT ENGINE MODULE MAY BE INTEGRATED ON A PRINTED CIRCUIT BOARD AS SHOWN ON THE DRAWING. THE INTEGRATED MODULE SHALL BE PROVIDED WITH GOLD-PLATED PINS TO BE INSERTED INTO SOCKETS EMBEDDED IN AN INTERFACE BASE MODULE. THE BASE MODULE SHALL BE PROVIDED WITH SOLDERING POINTS FOR EXTERNAL COPPER WIRES.
2. IN EITHER CONFIGURATION (SEE ABOVE), THE PINS OF THE LED OR THE INTEGRATED MODULE SHALL BE RIGID FOR THE LED OR THE MODULE TO BE EASILY EXTRACTED WITHOUT INCURRING DAMAGE TO THE PINS OR DEGRADING THE ELECTRICAL CONTACT. THE INTEGRATED MODULE SHALL PLUG INTO SPACERS ON THE BASE MODULE FOR PHYSICAL SUPPORT.
3. EACH CABINET PRIMARY ELECTRICAL LOAD IS 277VAC/2.0A.
4. FOR FINISHES OF CABINET AND MOUNTING BRACKET, SEE SPECIFICATIONS.
5. ILLUMINATED ASSEMBLY IS OPTIONAL, SEE SPECIFICATIONS



SECTION- MOUNTING DETAIL A
SCALE: 6"=1'-0"

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REGIONAL TRANSIT WAYFINDING GUIDELINES & STANDARDS



STANDARD DRAWINGS

INFORMATION CUBE
FOUR-FACE CUBE ASSEMBLY DIAGRAM
AND MOUNTING DETAIL

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